University of Alberta

Home Care Client Classification and Resource Use

by

Sally Jeanette Greenhill

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of *Master of Business Administration*.

Faculty of Business

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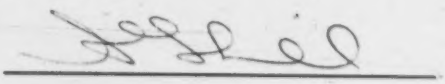

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DEDICATIONS

To Dave for his love, laughter, patience and encouragement.

To my family and friends for their support.

ABSTRACT

This study explores Alberta Health's secondary Home Care Client Classification (HCCC) data to determine if HCCC relates to resource use as identified by the hours of service provided to long term care Home Care Program clients in Alberta's Regional Health Authorities (RHAs) from June 1994 to December 1995. Results show that a positive relationship existed between the Combined Classification Score and hours of service. Those with higher HCCC scores (i.e., those with greater needs and less support from informal caregivers) received exponentially higher amounts of service than those with lower HCCC scores (i.e., those with lower functional needs and greater adequacy of informal support). In addition, findings indicate that, over time, caseloads experienced proportional decreases of those with lower needs and proportional increases of those with higher needs and, the relationship between the Combined Classification Score and service hours masked differences in mean amounts of service hours provided across regions.

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CHAPTER ONE

INTRODUCTION

Statement Of The Problem

This study proposes to explore Alberta Health's secondary Home Care Client Classification (HCCC) data to determine if HCCC relates to resource use as identified by the hours of service provided to long term care Home Care Program clients in Alberta's Regional Health Authorities (RHAs) from June 1994 to December 1995.

Purpose of the Study

The purpose of this study is to test the proposition that HCCC relates to resource use for RHAs' Home Care Programs. Independent variables will be four HCCC scores including the Functional Need Classification Score, the Informal Support Classification Score, the Combined Classification Score and, the Estimated Resident Classification Score. The dependent variable, resource use, will be service hours provided to Home Care Program clients receiving long term care services through RHAs from June 1994 to December 1995.

The Hypotheses

The null hypothesis is that no relationship exists between HCCC and resource use as identified by hours of service provided, that HCCC scores do not relate to service hours provided to Home Care Program clients.

The alternate hypothesis is that a relationship exists between HCCC scores and resource use, that HCCC does relate to service hours provided to Home Care Program clients. The higher the HCCC score, the greater the resource use.

Definitions of Terms

Alberta Assessment and Placement Instrument 1989 (AAPI)

The Alberta Assessment and Placement Instrument is a comprehensive assessment tool developed by Alberta Health to coordinate assessment and placement functions for long term care" (Alberta Health, 1989, p.4). It consists of six sections: request for service; comprehensive health assessment that includes physical status, psychosocial status, environmental, and accommodation appraisal; care providers; assessment summaries; placement recommendations; and, placement summary.

Alberta Health

Alberta Health is the Government of Alberta's Department of Health. The Minister of Health has the power to ensure that health services are provided in Alberta. (Province of Alberta, Regional Health Authorities Act, Section 16).

assessment

An assessment is "a process which involves an exchange of information between the individual and the Case Coordinator to comprehensively identify needs. Assessment information for a client with long term care needs is documented on a standardized form" (Alberta Health, 1995, Number 2.4, p.2).

case coordination

Case Coordination is a mandated service provided to all Home Care Program clients (Province of Alberta, 232/91, Section 4(b)). "The components of Case Coordination, done in collaboration with clients and caregivers, include:

- intake/screening;
- individual functional assessment;
- identification of needs, and the client/informal support capacity to meet those needs;

- care plan development;
- implementation of the care plan;
- reassessment/ongoing evaluation; and,
- discharge" (Alberta Health, 1995, Number 2.4, p.1).

Case Coordinator

A Case Coordinator is a professional person who provides Case Coordination expertise to clients receiving service through the Home Care Program (Alberta Health, 1995, Number 2.4, p.1).

classification

Classification is "the action of classifying or arranging in classes, according to common characteristics or affinities" (Oxford University Press, 1989).

Combined Classification Score

The Combined Classification Score is one of four classification scores generated by HCCC. It incorporates the sum of thirteen functional need indicators and informal support indicators identified on the AAPI. The Combined Classification Score categories are deciles, zero to nine, ranging from low to high, respectively. Each category represents one-tenth of the Alberta Home Care Program provincial caseload (Alberta Health, March 1994, p.iv).

Estimated Resident Classification Score (ERCS)

The Estimated Resident Classification Score is one of four classification scores generated by HCCC. It incorporates eight of thirteen functional need indicators identified on the AAPI. The eight indicators are a subset of the thirteen indicators used for the Functional Need Classification Score. The eight indicators are also the same functional need indicators used by the Resident Classification System (RCS). The Estimated Resident Classification Score incorporates the same configural method as the RCS but translates the data for comparability. The Estimated Resident Classification Scores, A to G, are seven categories of need, ranging from low to high, respectively. The Estimated Resident Classification System Score "estimates" the category as no testing was done to determine if the AAPI and the RCS would produce the same classification category for any individual client (Alberta Health, March 1994, p.41).

Functional Need Classification Score

The Functional Need Classification Score is one of four classification scores generated by HCCC. It incorporates the sum of thirteen functional need indicators identified on the AAPI and distinguishes five categories of need one to five, low to high, respectively (Alberta Health, March 1994, p.iii).

home care

Home care means "an array of services which enables clients incapacitated in whole or in part to live at home, often with the effect of preventing, delaying, or substituting for long term care (facility) or acute care (facility) alternatives. Home Care may be delivered under numerous organizational structures, and similarly numerous funding and client payment mechanisms. It may address needs specifically associated with a medical diagnosis . . . and/or may compensate for functional deficits in the activities of daily living . . . Home Care is a health program, with health broadly defined; to be effective it may have to provide services which in other contexts might be defined as social or education services. Home Care may be appropriate for people with minor health problems and disabilities, and for those who are acutely ill requiring intensive and sophisticated services and equipment" (Health and Welfare Canada, 1990, p.2).

Home Care Client Classification (HCCC)

Home Care Client Classification is a method used to describe, compare and track Alberta's RHAs' Home Care Program long term caseload. Two sets of thirteen indicators, functional need indicators and adequacy of informal support indicators, generate four component classifications: Functional Need Classification; Informal Support Classification; Combined Classification; and, Estimate Resident Classification (Alberta Health, March 1994, Exhibit A).

Home Care Information System (HCIS)

The Home Care Information System automates data, including HCCC, to provide information about "home care clients service volumes, service costs, and client profiles at a local and provincial level" (Alberta Health, October 1994, p.ii).

Home Care Program

The Home Care Program means the program as defined by the Public Health Act's Co-ordinated Home Care Program Regulation 232/91. In 1994, twenty-seven health units throughout Alberta offered the Home Care Program (Alberta

Health, November 1992). On June 1, 1994, the Alberta Legislature assented to the Regional Health Authorities Act and in April 1, 1995, seventeen RHAs assumed responsibility for health service delivery, including home care services.

Home Care Program services

Home Care Program services mean those services identified in the Home Care Program Regulation including assessment, Case Coordination, personal care, homemaking, support services, nursing, and rehabilitation therapy (Province of Alberta, 232/91). Home Care Program services also include other services supporting a multidisciplinary approach such as social work, nutritional therapy, and volunteers (Alberta Health, 1995, Number 4.1, p.1). Home Care Program policy expects that Home Care staff meet the performance requirements of their respective associations (Alberta Health, 1995, Number 4.2, p.1).

hours of service

Hours of service, or service hours, means the time provided to clients receiving long term care services through Home Care Programs based in the RHAs. Hours of service include time spent on assessment, Case Coordination, personal care, home support, and direct professional services. Direct professional services are those services identified in the Home Care Information System including social work, nursing, licensed practical nursing, physical therapy, occupational therapy, respiratory therapy, and others. "Others" includes volunteers, nutritional therapists, and other discretionary health care professionals as determined by the Home Care Programs (Alberta Health, October 1994, p.2.5).

Informal Support Classification Score

The Informal Support Classification Score is one of four classification scores generated by HCCC. It incorporates the sum of thirteen informal support indicators identified on the AAPI and distinguishes five categories of informal support adequacy, one to five. The first category, "1", represents "no informal support required"; categories, "2" through "5" represent high to low informal support adequacy, respectively (Alberta Health, March 1994, p.iv). The Informal Support Classification Score is sensitive to the presence of an identified need but not the level of need.

long term care

Long term care means services provided "on a continuing basis for greater than three months to gradually improve or maintain health status, functional status, level of independence, or to delay deterioration (Alberta Health, October 1994, p.1.20).

Regional Health Authority (RHA)

A regional health authority is a corporation responsible for the delivery of health services, diagnostic services or treatment services within its health region. (Province of Alberta, Regional Health Authorities Act.).

Resident Classification System (RCS)

The Resident Classification System, previously known as the Patient Classification System, groups long term care facility residents according to their care requirements. Until 1995, categories A to G, low to high care requirements and resource use, provided the basis for case-mix funding for Alberta's long term care facilities (Alberta Hospitals and Medical Care, January 1988, p.1).

resource use/utilization

Resource use, or resource utilization, is proxied by hours of service provided to clients receiving long term care assistance through the Home Care Program.

Assumptions

Various assumptions underlie this study. The first assumption is that home care services are cost-effective (Health Services Utilization and Research Commission, 1998, p. 1; National Forum on Health, 1997, p. 25). Second, that Alberta Health provided adequate HCCC training to RHAs, ensuring reliability. Third, that the HCCC system, introduced in April 1994, was stable by June 1994. Fourth, that the assessment process managed by the RHAs was reliable across regions. Fifth, that the AAPI was the standardized assessment form used by RHA Home Care Program Case Coordinators to document long term care assessment information. (Before April 1, 1995, twenty-seven local health boards managed the Home Care Program and all voluntarily documented long term care assessment information on the AAPI. Although Home Care Program policy requires Home Care Programs to document the long term care assessment information on a standardized form, it does not specify the AAPI as that standard form). Finally, this study assumes that service hours is a good proxy for resource use. During the

development of HCCC, resource use was defined as a combination of hours of service and total cost.

Significance of the Study

Today, challenges for Alberta's health care system include fiscal restraints, advancing technologies, a changing population, a shift to community-based services and, an increased focus on providing care closer to an individual's home. As key players in the health care system, Home Care Program managers within Alberta's health system must respond effectively and efficiently to these trends to meet growing consumer demands and expectations.

Although Home Care Program managers have a variety of alternatives with which to support clients living at home, they need administrative tools to ensure appropriate stewardship of resources. In 1994, Alberta Health introduced HCCC to help describe, compare and track Alberta's Home Care Program long term caseload. This management tool was developed to show the potential impact of a client on the Home Care Program caseload by assuming those with higher HCCC scores (higher needs and lower adequacy of informal support) would receive more service than those with lower HCCC scores (lower needs and higher adequacy of informal support). Estimates of the amount of required service is integral to controlling costs. This positive relationship would allow for indications of the impact of a client on the caseload and of future resource requirements.

This study proposes to inspect and consider the relationship between HCCC and resource use as described by service hours provided to the Home Care Program's active monthly long term care caseload from June 1994 to December 1995. Findings should provide administrators and policy makers with significant information regarding the allocation of resources. Alberta Health's *Home Care Client Classification (HCCC)*

System Final Report recommends reviewing the classification system to confirm, among other things, "the credibility and usefulness of the classification system and its components as an administration tool" (Alberta Health, March 1994, p.vi & 42). Determining whether HCCC relates to resource use as identified by service hours provided during fiscal years 1994 and 1995 will provide preliminary insight into the application of HCCC as a management tool.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This literature review focuses on classification systems designed for use in North American home care programs paying particular attention to those systems that incorporate client functional need and informal support systems. The chapter examines industry trends, notes home care classification systems developed in the United States, and discusses classification systems developed in Alberta, Canada paying particular attention to Alberta's Home Care Client Classification system.

Industry and Environmental Trends

Several environmental trends in the North American health care industry are affecting home care programs and the development of classification systems. First, the concept of health care is changing. More people recognize that good health is dependent upon more than traditional health care services and when given the choice, consumers often prefer services be provided in their homes. Increasingly, home care substitutes for acute and long term care facility care, provides maintenance services to allow people to remain independent in their own homes, and is used as a preventative measure to avert additional client needs and associated costs (Alberta Health, August 1992). The challenge for the health care system is to move services into the community while maintaining quality and cost-effectiveness (National Forum on Health, 1997, p.25).

Next, changes in demographics and socioeconomic circumstances are resulting in an expanding home care market. Life expectancy has increased and greater numbers of

people with chronic disabilities of all ages are living in the community (Alberta Health, August 1992, pp.9-11). This epidemiological change, has contributed to an increased demand for quality community service and is prompting increased growth in the scope of community support available to people with disabilities. Socioeconomic circumstances such as the entry of women into the paid labour force, increased mobility, and the trend toward smaller families has lead to fewer informal caregivers being available to assist individuals at home (Alberta Health, August 1992, p.3). The involvement of informal caregivers is critical to effective community service resource management (Alberta Health, January 1995, Chapter, Preface) and home care's philosophy is to offer services that supplement the care voluntarily provided by the client, family and community (Alberta Health, January 1995, Chapter, Preface). Fewer informal caregivers along with increased life expectancies have heightened the strain on home care programs.

Advances in technology is the third trend. Improved technologies and new treatment modalities have allowed home care programs to extend their service delivery. Treatments that were previously only available in hospital are now being provided in the home to a variety of consumer groups such as seniors, persons with disabilities, children with complex needs, and people with mental illness, brain injuries, or AIDS (Alberta Health, August 1992, p.3). To meet these clients' needs effectively, staff must be increasingly specialized and require enhanced skill development accelerating home care program costs.

Finally, the trend of fiscal restraint in other health care sectors is affecting home care services. To deal with reduced budgets, the acute care sector has decreased inpatient services and enhanced early discharges resulting in more people with complex care needs being supported in the community through home care (National Forum on Health, 1997, p.23). In addition, while long term care facilities target funds to those with higher needs and reduce beds for those with lighter needs, home care programs are providing

service to clients with higher levels of chronicity. Home care is increasingly viewed as a viable alternative to long term facility care and as a cost-effective substitute for hospital care and many more people are receiving care at home who, until a few years ago, would have been admitted to an a acute care hospital or a long term care facility (Health Services Utilization and Research Commission, March 1998, p.1).

These trends are a challenge for community programs. Home care programs must adapt their organizations and operations to meet increased system pressures and expectations. At the same time, they must understand and respond to the diverse needs of a variety of client groups (Alberta Health, August 1992, p. 8-14). As resources become more scarce, home care programs must continually reprioritize to meet the growing demand and to improve the management of these resources. Some programs are moving towards the implementation of classification systems to assist with this process.

Classification Systems

There is increasing interest in the classification of home care clients and in 1992, Health and Welfare Canada released the report *Classification of Long Term Care Clients in Home Care* which suggested the Canadian health care system could benefit from a national classification framework. At that time, a window of opportunity existed "because all jurisdictions (had) not yet adopted systematic client classification schemes or linked classification to funding" (Health and Welfare Canada, 1992) It was felt a national classification system would "assist home care programs to respond to questions about their effectiveness and improve program management" (Health and Welfare Canada, 1992, p.2). To date, a national classification system has not been introduced.

Although increasing support exists for the development of home care classification systems, most classification schemes focus on acute care hospitals and long term care facilities. Very few are specifically developed for home care clients. The search of the

databases CancerLit (1992 - April 1996), CINAHL (1982 - March 1996), EMBASE (1988 - present), Eric (1984 to April 1996), Health (1975 to December 1995), MDX Health Digest (1988 to April 1996), and Medline (1966 to present) found a small number of American studies on home care classification systems and no studies on Canadian home care classification systems outside those developed in Alberta. Although the systems designed in the United States were developed for a private-pay, market-driven health care system and may have limited application in a Canadian context, this review does consider them because of the limited number of existing classification systems focusing on home care clients.

United States' Home Care Classification Systems

Unlike the Canadian classification systems found in Alberta, none of the classification systems developed in the United States emphasize functional need and adequacy of informal support to determine the amount of resources a client may require. Instead, they generally focus on nursing diagnosis, type of nursing intervention, and Medicare enrollment. Only one American classification system considers providers other than nurses (Williams et al. 1990).

Branch and Goldberg (1993) developed a case-mix model for grouping Medicare home health care clients according to allowable charges for their home care. They administered this hierarchical framework with the total group dichotomized on the presence or absence of a single variable, and then further dichotomized on additional clinical clusters. Four components - rehabilitation, special care, skilled-nurse monitoring, and paralysis - were used to yield eleven case-mix groups. The number of "discipline specific visits received" explained rehabilitation and skilled-nurse monitoring. A combination of "diagnosis" and "service received" defined special care. While the paralysis component included functional limitations, the authors did not mention gathering information on informal caregivers. Only five percent of the sample received service for six months or longer. 71.7% received service for sixty or fewer

days. Although the data came from ten geographically dispersed states, self-selection and an urban-based population limited the data. The study noted that the intake case manager, who judged the need for clinical services, could "game" the system to optimise reimbursement. This classification is one of several prospective payment systems (PPS) for Medicare clients. The need for resource reimbursement in a prospective payment system directs attention to interventions and services provided rather than client needs.

In a three-part series, Saba (1992) discussed the Home Health Care Classification developed by the Georgetown University School of Nursing. This model primarily based its classification system for home health Medicare clients on a nursing model. Twenty home health care components are considered including nursing diagnosis with expected outcome goals, nursing interventions, medical groups, functional status variables, and sociodemographic variables. Once the variables are scored, clients are placed according to cohort and assigned an average number of home care nursing and other provider visits (Saba, October 1992.).

Churness et al. (1991) said that developing a classification system to predict the amounts and types of nursing care required was difficult because of the diversity of clients. They developed a patient classification system for Medicare clients that assigned nursing time per visit to one of five levels of care. The patient-classification system was initiated in a Los Angeles, nonprofit home health agency, in which staff nurses completed a factor-evaluation instrument. The nurses captured information on activities and procedures completed during a home visit. A factor score for each home visit resulted in the home visits being classified into one of five levels of nursing resource use. Nurses volunteered to participate in the study and the non-random sample consisted of two groups representing a total of 408 patients. The statistical analysis showed a high predictive validity between the factor score and length of visit. Churness et al. did not include functional limitations and the presence or absence of a caregiver in their analysis as they found interrater reliability for these items was low. However, the

authors said they would include functional limitations and information on informal support in future studies as the raw data suggested they probably accounted for part of the variance.

Trisolini et al. (1994) analysed the factors affecting nursing visit length and suggested that visit-specific variables have the largest influence on length of visit. The sample included seven nurses who collected data for six days on all routine visits for a total of 273 visits. The data collection instrument captured information on five categories of variables related to the patient, provider, and the visit. The category of patient's "clinical status" included medical, nursing and functional information. They captured functional information on broad categories of impaired versus unimpaired status. The study did not include more detailed information on functional status as the nurses felt it was not necessary when the dependent variable was nursing time per visit. None of the clinical status variables were significant in the final model. In this study, living with a spouse was found to increase visit time. The authors speculated that nurses needed more time when the spouse was present due to teaching the family member about the care and/or to discuss the situation generally. This variable was not in the final model as it was found not to be significant. As with the Churness et al. study, Trisolini et al. limited their data to a single agency. The Trosolini study was conducted in an urban setting with a small sample size.

Albrecht's (1991) descriptive, correlational study was completed to assess the reliability and validity of the Easley-Storfjell (ES) patient-classification instrument. The study determined the instrument's usefulness in a large institutional hospital-based home care setting (HBHC). Developed by Allen, Easley, Storfjell in 1986, the ES instrument provided a comprehensive patient-classification instrument for home health care and included broad variables for classification: clinical judgment; teaching needs; physical care; psychosocial needs; multiagency involvement; and, number and severity of problems. Its strengths were ease of use and the little time needed for completion.

However, Allen, Easley, and Storfjell had not established reliability and validity. The ES instrument was a prototype instrument and required raters to match the characteristics of a client with an overall category. Although Albrecht confirmed the tool's reliability and validity using four nurse raters, its small sample size and location limited the study. The sample consisted of thirty male clients receiving service through one Veteran's Administration hospital.

Albrecht commented on the difference in needs of home care clients compared with institutional patients. She noted that "home care (clients) do not need medical care, but they do require nursing care as well as other recuperative assistance such as physical therapy or a home health aide. Therefore, prospective payment should classify these patients according to their actual home care needs and not their medical needs" (Albrecht, 1991, p.125).

Williams et al. (1990) reviewed routinely collected information on clients with Medicare or Medicaid enrollment and used the information to predict resource use. Age, sex, Medicare and Medicaid enrollment, referral source, medical diagnosis, and prognosis were the administrative data reviewed. Although patient payer status, diagnosis, prognosis, and the time of enrollment were the factors that accounted for some service intensity, Williams et al. speculated that information about chronic functional impairments and patterns of informal caregiving would be more useful. They said "patterns of informal caregiving almost certainly affect the types and amounts of home health services provided to patients, but are difficult to measure and have not been extensively examined" (Williams, 1990, p.389).

In summary, the small number of home care classification systems designed in the United States are developed in the context of a private pay, market-driven health care system and, generally, emphasize and measure nursing diagnosis, type of nursing intervention, and Medicare enrollment. As exemplified in the next section, this contrasts

with the classification systems developed in Alberta, Canada which focus on functional need and adequacy of informal support to determine services provided to clients.

Alberta's Home Care Client Classification (HCCC) System

The Home Care Program in Alberta, Canada is legislated by Alberta's Public Health Act's Coordinated Home Care Program Regulation 215/94. When the Government of Alberta initially introduced the program in 1978, the emphasis was on maintaining elderly people at home by providing professional health services. Since 1991, all Albertans, no matter what their age or disability, are potentially eligible for both professional services and support services (Alberta Health, August 1992). Home care services in Alberta were offered through twenty-seven health units until 1995. In April 1995, seventeen regional health authorities replaced over two hundred boards and administrations and assumed responsibility for hospitals, long term care facilities, and public health programs including home care services.

In 1994, Alberta Health introduced HCCC to help describe, compare and track the Home Care Program's long term caseload (Alberta Health, March 1994). The long term caseload consists of clients who required services "on a continuing basis for greater than three months to gradually improve or maintain health status, functional status, level of independence, or to delay deterioration" (Alberta Health, October 1994, p.1.20). Key elements of HCCC include the focus on a client's needs and care required rather than services provided, consideration of several critical indicators of care, and the link between assessment and classification.

HCCC "falls out" of documentation on the Alberta Assessment and Placement Instrument (AAPI). The AAPI is the form used by Home Care Program Case Coordinators to standardize documentation of the long term care assessment process. Introduced in 1989, the AAPI was designed to provide "a comprehensive evaluation and placement recommendation for every resident of the province applying for long-term

care (LTC) or seeking a change in the level of LTC received" (McKenzie, 1989, p.937). The assessment components of the AAPI consist of six sections: request for service; comprehensive health assessment which includes physical status, psychosocial status, environmental, and accommodation appraisal; care providers; assessment summaries; placement recommendations; and, placement summary. Fifty-six indicators capture the assessment information.

HCCC is based on a factor evaluation system rather than a prototype approach. Development of HCCC began in 1990 and a committee consisting of representatives from Alberta Health and the health units completed the process in three phases. During the final phase, thirteen of the fifty-six AAPI functional need indicators were found to effectively distinguish one group of clients from another. The committee also discovered that combining the adequacy (availability, capability, willingness) of informal support with each of the functional need indicators provided consistently higher correlations with validators (Alberta Health, March 1994). The final HCCC system uses the summed scores of individual functional need indicators and informal support indicators.

HCCC was constructed from data gathered on a sample of 201 clients representing the long term rural, urban, north, south and central Home Care Program caseload. HCCC had high internal reliability and positive correlations with a variety of validators including resource use and professional judgment. Resource use consisted of hours of service and total cost (Alberta Health, March 1994).

Case Coordinators document the long term assessment information on the AAPI and the scores from the AAPI's thirteen functional need indicators and thirteen informal support system indicators are entered into the Home Care Information System (HCIS). The HCIS then creates the following four HCCC outputs:

- Functional Need Classification Score;

- Informal Support Classification Score;
- Combined Classification Score; and,
- the Estimated Resident Classification Score.

The Functional Need Classification Score is generated by incorporating the sum of thirteen functional need indicators identified on the AAPI. It distinguishes five categories of need one to five, low to high, respectively (Alberta Health, March 1994, p.iii). These thirteen indicators include:

- activities of daily living (ADL) indicators: eating, dressing, toileting, transferring, grooming, bathing, indoor mobility, outdoor mobility;
- behaviours of daily living (BDL) indicators: coping, potential for injury; and,
- continuing care level (CCL) indicators: urinary management, bowel management.

The Informal Support Classification Score incorporates the sum of the thirteen informal support indicators identified on the AAPI. It distinguishes five categories of informal support adequacy, one to five. The first category, "1", represents "no informal support required"; categories, "2" through "5" represent high to low informal support adequacy, respectively (Alberta Health, March 1994, p.iv). The Informal Support Classification Score is sensitive to the presence of an identified need but not the level of need. Each informal support indicator corresponds with a functional need indicator and asks the question "Is informal support willing and able to meet the need?". Informal support adequacy considers willingness, availability, and capacity to provide care (Alberta Health, 1989, p.112).

The Combined Classification Score incorporates the sum of thirteen functional need indicators and informal support indicators identified on the AAPI. The Combined Classification Score categories are deciles, zero to nine, ranging from low to high, respectively. Each category represents one-tenth of the Alberta Home Care Program provincial caseload (Alberta Health, March 1994, p.iv). The *Home Care Client*

Classification (HCCC) System Final Report indicates it expects the strength of HCCC to be found in the Combined Classification Score (Alberta Health. March 1994. p.20).

The Combined Classification Score is relative to the current provincial caseload and Alberta Health plans to periodically reset it so the categories always represent one-tenth of the provincial caseload (Alberta Health, March 1994, p.42). To show changes to the caseload over time, categories for the Functional Need Classification Score and Informal Support Classification Score will not be adjusted.

The Estimated Resident Classification Score incorporates eight of the thirteen functional need indicators identified on the AAPI and used for the Functional Need Score. The eight functional need indicators are the same functional need indicators used by the Resident Classification System (RCS). The Estimated Resident Classification Score incorporates the same configural method as the RCS but translates the data for comparability. The Estimated Resident Classification Scores, A to G, are seven categories of need, ranging from low to high, respectively. The Estimated Resident Classification System Score "estimates" the category as no testing was done to determine if the AAPI and the RCS would produce the same classification category for any individual client (Alberta Health, March 1994, p.41). The eight RCS functional need indicators used for the Estimated Resident Classification Score include:

- activities of daily living (ADL) indicators: eating, dressing, toileting, transferring;
- behaviours of daily living (BDL) indicators: coping, potential for injury; and,
- continuing care level (CCL) indicators: urinary management, bowel management.

RHAs are responsible for entering information from the AAPI's thirteen functional need indicators and thirteen informal support system indicators into the Home Care Information System (HCIS). As RHA information systems are independent, RHAs contribute to the provincial perspective by forwarding their local HCIS data to Alberta Health where it is aggregated on a provincial basis and distributed back to the RHAs.

HCCC was not designed as a funding methodology but was expected to be used when examining overall resource requirements at the regional and provincial levels. The *Home Care Client Classification (HCCC) System Final Report* recommends a review after the first year of implementation to confirm or modify various features of the system (Alberta Health, March 1994, p.42).

Alberta's Resident Classification System (RCS)

Although Alberta's Resident Classification System (RCS) is designed for use in long term care facilities rather than the community, this literature review examines the RCS because of its link with Alberta's HCCC. In 1988, Alberta introduced the RCS to produce classification categories that would group long term care facility residents with similar types of care requirements and similar amounts of nursing service needs (Alberta Hospitals and Medical Care, 1998). The study team tested medical diagnoses, functional status, therapeutic interventions and family participation as possible predictors of nursing care required. They linked care requirements to the amount of nursing time used by each resident and found functional status to be the best predictor.

RCS uses eight functional need indicators to determine an individual's classification. HCCC uses these same eight indicators in its Estimated Resident Classification Score (ERCS). RCS determines seven classification categories, A to G, indicating low to high care requirements and resource use. It standardizes the categories with Category A having a weight of 1.0 and Category G having a weight of 5.18. A resident with a Category G requires, on average, 5.18 times as much nursing care time as Category A resident, on average. These weights determine the case-mix index (CMI) for each long term care facility. The CMI provides a measure of one facility's "heaviness of care" compared with other facilities in the province. Before regionalization, Alberta Health used the RCS as a funding methodology for the long term care facilities.

CHAPTER THREE

METHODS AND PROCEDURES

Research Design

The purpose of this study is to examine the relationship between HCCC scores and service hours and to note any factors contributing to the relationship. HCCC suggests that clients with low HCCC scores (i.e., those with fewer needs and more support from informal caregivers) require, and should receive, fewer hours of home care service than clients with high HCCC scores (i.e., those with greater functional needs and lower adequacy of informal support).

This study's research design is exploratory, analysing secondary data to determine the relationship between HCCC scores and hours of service provided to long term care Home Care Program clients receiving service through Regional Health Authorities (RHAs) from June 1994 to December 1995. The null hypothesis is that no relationship exists between HCCC and resource use as identified by service hours, that HCCC scores do not relate to resource use as identified by hours of service provided to Home Care Program clients. The alternate hypothesis is that a relationship exists between HCCC scores and resource use, that HCCC relates to resource use as identified by service hours to Home Care Program clients. The alternate hypothesis proposes that the lower the HCCC score, the lower the resource use; the higher the HCCC score, the greater the resource use.

HCCC was designed, developed, and piloted with consideration to regional differences including geographic location, small and large populations, and rural and urban factors. Therefore, it is assumed the relationship between HCCC scores and service hours is

similar throughout the province. To determine similarities or differences across regions, regional health authorities along with the provincial caseload are considered.

To note trends over time, this study investigated four six-month time intervals from fiscal years 1994 and 1995. If HCCC was building on already existing best practice, it could be assumed the relationship between HCCC scores and resource use would remain the same over time. If, instead, HCCC was introducing best practice, it could be assumed that, as practice improved, the relationship between classification scores and resource use would significantly strengthen over time.

Data is analyzed using Microsoft Excel for Windows 95, Version 7.0a, and Statistical Package for Social Sciences (SPSS) for Windows, Release 7.0. Scatterplots provide material for visual inspection; descriptive statistics consist of client count, mean service hours, standard deviations, standard errors, confidence interval for the mean, and minimum and maximum service hours. Inferential statistics include Kolmogorov-Smirnov's test of normality, Spearman's rho correlation, chi-square test of association and analysis of variance (ANOVA) for group means.

Data Source

Alberta Health authorized disclosure of anonymous individual data for use in this study. At the time of the research request in March 1997, HCCC data for fiscal years 1994 and 1995 was available. Alberta Health provided secondary data in self-extracting zip files that included per individual client, the health region (scrambled), patient identifier (scrambled), Combined Classification Score, Functional Need Classification Score, Informal Support Classification Score, Estimated Resident Classification Score (ERCS), year of service, month of service, and service hours.

Treatment and Analysis of Data

The independent variable for this study is HCCC represented by four components including the Combined Classification Score, the Functional Need Classification Score, the Informal Support Classification Score, and the Estimated Resident Classification Score. The dependent variable is service hours provided to the active caseload of long term care clients. The active caseload includes all Albertans who received long term care services through RHAs during a particular month. RHA identities are scrambled to ensure anonymity. Based on client count for June 1994, the region with the lowest client count was named RHA_A; the region with the highest client count named RHA_Q. The provincial caseload was named PROV.

The researcher began by examining the data for all seventeen regional health authorities and the provincial caseload by each of the classification scores by eight time periods. Initial analysis involved generating and examining scatterplots for each of the regions along with the provincial caseload to see how the independent and dependent variables visually related to each other. Outliers were not identified or removed as this study examines regional and provincial populations for the long term caseload, rather than sample caseloads. Descriptive univariate analysis was completed for each HCCC component including client count, mean service hours, standard deviations, standard errors, confidence interval for the mean, and minimum and maximum service hours. This research employed detailed analyses using chi-square test of association and analysis of variance to understand more fully the relationship between the HCCC and service hours.

In view of the large quantity of data, the researcher decided to limit the parameters of the study. Instead of considering all HCCC components, the Combined Classification Score became the independent variable investigated. This choice was based on the *Home Care Client Classification (HCCC) System Final Report* which indicated the

strength of HCCC was expected in the Combined Classification Score (Alberta Health. March 1994. p.20). In addition, numbers of time periods were reduced from quarterly reviews to four six-month intervals to include June 1994 (9406), December 1994 (9412), June 1995 (9506), and December 1995 (9512). HCCC was introduced in April 1994. This study assumed that the system was stable by June 1994 and that investigating four snapshots in an eighteen month period would reveal emerging trends.

Instead of investigating seventeen RHAs, this study arbitrarily examined RHA_A, the smallest region by client count, along with every third region by size order to include RHA_A, RHA_D, RHA_G, RHA_J, RHA_M, RHA_P, and PROV, the provincial caseload. Because electronic software packages can compute large databases, the researcher chose not to limit the regional and provincial caseload sizes.

Results

Visual exploration of scatterplots indicated that RHA_A, the smallest region by client count, displayed little relationship between the Combined Classification Score and service hours. Regardless of the time period, the points did not slope in any particular direction. Other regions showed slight slopes from the bottom left to the top right which indicated possible positive relationships. For these regions, slopes appeared to get stronger over time and seemed more pronounced for regions with larger client counts. In June 1994, RHA_P and the provincial caseload, PROV, displayed noticeable slopes from the lower left to the upper right. However, this slope was less clear by December 1995. Appendices A to G, RHA_A, RHA_D, RHA_G, RHA_J, RHA_M, RHA_P, and PROV, respectively, illustrates the scatterplots.

As expected, it visually appeared that the dependent variable was not normally distributed. As a result, this study applied the Kolmogorov-Smirnov goodness-of-fit test to confirm whether the observations could have reasonably come from normal

distributions. Results indicated that, statistically, the dependent variable was not normally distributed for any region, nor the provincial caseload. Detailed results are shown in Appendices A to G.

Since the Combined Classification Score is comprised of ordered categories and service hours are not normally distributed, this study employed a nonparametric statistic, the Spearman's rho (r_s), to measure the strength of the relationship between the two. As a direction of association was not assumed, a two tailed test of significance was chosen. Table 3.1 summarizes the results and significance levels.

	9406 r_s	9412 r_s	9506 r_s	9512 r_s
RHA_A	-0.094	0.134	0.103	0.228*
RHA_D	0.053	0.385**	0.373**	0.224**
RHA_G	0.267**	0.266**	0.266**	0.274**
RHA_J	0.186**	0.331**	0.223**	0.278**
RHA_M	0.306**	0.322**	0.305**	0.364**
RHA_P	0.330**	0.383**	0.401**	0.426**
PROV	0.325**	0.358**	0.372**	0.414**
* $p = 0.05$, ** $p = .01$				

Table 3.1 Spearman's Rho Correlation (r_s): Combined Classification Score by Service Hours

Table 3.1 indicates that across all time periods a positive relationship existed between the Combined Classification Score and service hours for four of six regions along with the provincial caseload. As the two variables were not independent but were related at a

statistically significant level for RHA_G, RHA_J, RHA_M, RHA_P, and PROV, the null hypothesis was rejected. These findings were highly reliable at a significance level of .01. That is, there is a less than a 1% chance that the findings occurred by coincidence alone. In addition, except for the first time period, the null hypothesis was rejected at the .01 significance level for RHA_D. However, the null hypothesis was not rejected until the last time period for RHA_A. During 9406, 9412, and 9506, RHA_A showed no significant statistical relationship between the Combined Classification Score and service hours until 9512 when a positive relationship at the .05 significance level was found.

This study completed descriptive univariate analysis for the Combined Classification Score by each of the regions and the provincial caseload for the four time periods. Appendices A to G provides details of this data. Appendix B and Appendix G indicate that the minimum amount of service provided to a client was -.25 hours. Upon further examination, this negative amount of service was attributed to only one client, originating with RHA_D in 9406. The researcher assumed this unusual finding to be due to data entry error.

Summary information regarding client count and percentages, total service hours and percentages, and mean hours of service by time period for RHA_A is found in Tables 3.2.1 to 3.2.3, respectively. Tables 3.3.1 to 3.8.3 provide the same information for RHA_D, RHA_G, RHA_J, RHA_M, RHA_P, and PROV, respectively.

RHA_A

	9406		9412		9506		9512	
Score 0	9	21.4%	13	16.5%	21	23.1%	17	21.3%
Score 1	6	14.3%	12	15.2%	13	14.3%	11	13.8%
Score 2	3	7.1%	5	6.3%	8	8.8%	6	7.5%
Score 3	4	9.5%	8	10.1%	9	9.9%	12	15.0%
Score 4	0	0.0%	4	5.1%	4	4.4%	8	10.0%
Score 5	1	2.4%	6	7.6%	7	7.7%	4	5.0%
Score 6	1	2.4%	1	11.3%	1	1.1%	1	1.3%
Score 7	5	11.9%	7	8.9%	6	6.6%	1	1.3%
Score 8	2	4.8%	7	8.9%	6	6.6%	3	3.8%
Score 9	11	26.2%	16	20.3%	16	17.6%	17	21.3%
Total	42	100%	79	100%	91	100%	80	100%

Table 3.2.1 RHA_A Client Count and Percentage

	9406		9412		9506		9512	
Score 0	105.00	18.7%	123.25	16.7%	157.25	17.6%	104.00	13.3%
Score 1	145.50	25.9%	80.25	10.8%	114.25	12.8%	127.75	16.3%
Score 2	56.50	10.1%	34.00	4.6%	53.50	6.0%	56.25	7.2%
Score 3	62.75	11.2%	78.25	10.6%	108.25	12.1%	113.75	14.5%
Score 4	0.00	0.0%	38.25	5.2%	41.00	4.6%	102.25	13.0%
Score 5	9.00	1.6%	34.75	4.7%	43.25	4.8%	23.50	3.0%
Score 6	6.00	1.1%	8.75	1.2%	0.50	0.1%	0.25	0.0%
Score 7	127.00	22.6%	53.75	7.3%	60.25	6.7%	15.00	1.9%
Score 8	42.25	7.5%	43.75	5.9%	47.50	5.3%	22.50	2.9%
Score 9	7.50	1.3%	244.75	33.1%	267.50	29.9%	219.25	27.9%
Total	561.50	100%	739.75	100%	893.25	100%	784.50	100%

Table 3.2.2 RHA_A Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	11.67	9.48	7.49	6.12
Score 1	24.25	6.69	8.79	11.61
Score 2	18.83	6.80	6.69	9.38
Score 3	15.69	9.78	12.03	9.48
Score 4	0.00	9.56	10.25	12.78
Score 5	9.00	5.79	6.18	5.88
Score 6	6.00	8.75	0.50	0.25
Score 7	9.45	7.68	10.04	15.00
Score 8	4.75	6.25	7.92	7.50
Score 9	14.05	15.30	16.72	12.90
Total	13.37	9.36	9.82	9.81

Table 3.2.3 RHA_A Mean Service Hours

RHA_D

	9406		9412		9506		9512	
Score 0	21	23.9%	17	20.2%	16	13.1%	15	10.9%
Score 1	12	13.6%	10	11.9%	9	7.4%	7	5.1%
Score 2	10	11.4%	11	13.1%	13	10.7%	16	11.6%
Score 3	9	10.2%	12	14.3%	17	13.9%	23	16.7%
Score 4	9	10.2%	9	10.7%	13	10.7%	18	13.0%
Score 5	7	8.0%	3	3.6%	8	6.6%	13	9.4%
Score 6	0	0.0%	2	2.4%	7	5.7%	6	4.3%
Score 7	6	6.8%	5	6.0%	8	6.6%	10	7.2%
Score 8	7	8.0%	7	8.3%	12	9.8%	7	5.1%
Score 9	7	8.0%	8	9.5%	19	15.6%	23	16.7%
Total	88	100%	84	100%	122	100%	138	100%

Table 3.3.1 RHA_D Client Count and Percentage

	9406		9412		9506		9512	
Score 0	110.75	13.5%	89.00	9.9%	110.75	5.4%	181.75	9.0%
Score 1	42.50	5.2%	56.75	6.3%	86.00	4.2%	35.50	1.8%
Score 2	76.75	9.3%	65.00	7.2%	74.50	3.6%	123.50	6.1%
Score 3	28.00	3.4%	85.25	9.4%	80.50	3.9%	188.75	9.4%
Score 4	76.50	9.3%	42.75	4.7%	153.25	7.5%	102.25	5.1%
Score 5	48.00	5.8%	15.50	1.7%	32.00	1.6%	48.00	2.4%
Score 6	0.00	0.0%	15.00	1.7%	32.75	1.6%	50.75	2.5%
Score 7	30.00	3.6%	35.25	3.9%	50.50	2.5%	82.50	4.1%
Score 8	99.00	12.0%	107.50	11.9%	187.25	9.2%	86.00	4.3%
Score 9	310.50	37.8%	390.50	43.3%	1238.50	60.5%	1112.00	55.3%
Total	822.00	100%	902.50	100%	2046.00	100%	2011.00	100%

Table 3.3.2 RHA_D Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	5.27	5.24	6.92	12.12
Score 1	3.54	5.68	9.56	5.07
Score 2	7.68	5.91	5.73	7.72
Score 3	3.11	7.10	4.74	8.21
Score 4	8.50	4.75	11.79	5.68
Score 5	6.86	5.17	4.00	3.69
Score 6	0.00	7.50	4.68	8.46
Score 7	5.00	7.05	6.31	8.25
Score 8	14.14	15.36	15.60	12.29
Score 9	44.36	48.81	65.18	48.35
Total	9.34	10.74	16.77	14.57

Table 3.3.3 RHA_D Mean Service Hours

RHA_G

	9406		9412		9506		9512	
Score 0	33	17.8%	60	18.9%	59	15.6%	43	11.7%
Score 1	28	15.1%	55	17.4%	61	16.1%	55	15.0%
Score 2	29	15.7%	40	12.6%	41	10.8%	40	10.9%
Score 3	21	11.4%	39	12.3%	52	13.7%	55	15.0%
Score 4	20	10.8%	33	10.4%	38	10.0%	43	11.7%
Score 5	13	7.0%	23	7.3%	35	9.2%	47	12.8%
Score 6	6	3.2%	11	3.5%	17	4.5%	14	3.8%
Score 7	14	7.6%	16	5.0%	26	6.9%	24	6.5%
Score 8	9	4.9%	19	6.0%	24	6.3%	20	5.4%
Score 9	12	6.5%	21	6.6%	26	6.9%	26	7.1%
Total	185	100%	317	100%	379	100%	367	100%

Table 3.4.1 RHA_G Client Count and Percentage

	9406		9412		9506		9512	
Score 0	129.75	11.3%	216.50	12.6%	186.00	10.0%	139.25	7.8%
Score 1	124.00	10.8%	184.50	10.8%	237.00	12.7%	163.50	9.2%
Score 2	175.50	15.2%	229.00	13.3%	151.75	8.2%	170.25	9.6%
Score 3	100.50	8.7%	166.50	9.7%	261.00	14.0%	244.50	13.7%
Score 4	163.00	14.1%	217.75	12.7%	198.75	10.7%	254.75	14.3%
Score 5	68.75	6.0%	165.75	9.7%	186.00	10.0%	262.75	14.8%
Score 6	47.00	4.1%	56.00	3.3%	95.75	5.1%	86.50	4.9%
Score 7	126.75	11.0%	133.75	7.8%	162.25	8.7%	123.75	7.0%
Score 8	86.00	7.5%	160.50	9.4%	153.25	8.2%	135.75	7.6%
Score 9	130.75	11.3%	186.00	10.8%	229.25	12.3%	198.00	11.1%
Total	1152.00	100%	1716.25	100%	1861.00	100%	1779.00	100%

Table 3.4.2 RHA_G Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	3.93	3.61	3.15	3.24
Score 1	4.43	3.35	3.89	2.97
Score 2	6.05	5.73	3.70	4.26
Score 3	4.79	4.27	5.02	4.45
Score 4	8.15	6.60	5.23	5.92
Score 5	5.29	7.21	5.31	5.59
Score 6	7.83	5.09	5.63	6.18
Score 7	9.05	8.36	6.24	5.16
Score 8	9.56	8.45	6.39	6.79
Score 9	10.90	8.86	8.82	7.62
Total	6.23	5.41	4.91	4.85

Table 3.4.3 RHA_G Mean Service Hours

RHA_J

	9406		9412		9506		9512	
Score 0	31	10.3%	52	8.8%	44	7.3%	47	8.3%
Score 1	28	9.3%	53	9.0%	43	7.2%	43	7.6%
Score 2	36	12.0%	59	10.0%	54	9.0%	52	9.1%
Score 3	35	11.7%	82	13.9%	85	14.2%	79	13.9%
Score 4	39	13.0%	76	12.9%	80	13.3%	71	12.5%
Score 5	21	7.0%	54	9.1%	58	9.7%	59	10.4%
Score 6	18	6.0%	35	5.9%	39	6.5%	32	5.6%
Score 7	29	9.7%	60	10.2%	66	11.0%	62	10.9%
Score 8	18	6.0%	48	8.1%	60	10.0%	48	8.4%
Score 9	45	15.0%	72	12.2%	71	11.8%	76	13.4%
Total	300	100%	591	100%	600	100%	569	100%

Table 3.5.1 RHA_J Client Count and Percentage

	9406		9412		9506		9512	
Score 0	179.75	6.4%	212.25	3.3%	405.50	5.3%	343.50	4.8%
Score 1	164.50	5.9%	252.50	3.9%	206.50	2.7%	210.75	2.9%
Score 2	249.50	8.9%	345.25	5.4%	291.00	3.8%	256.00	3.6%
Score 3	270.25	9.6%	484.50	7.5%	659.75	8.7%	568.00	7.9%
Score 4	364.00	12.9%	567.00	8.8%	706.75	9.3%	478.75	6.7%
Score 5	127.75	4.5%	421.75	6.6%	537.25	7.1%	437.00	6.1%
Score 6	231.50	8.2%	301.75	4.7%	432.00	5.7%	242.25	3.4%
Score 7	257.25	9.1%	635.50	9.9%	791.50	10.4%	751.50	10.5%
Score 8	203.25	7.2%	812.00	12.6%	843.50	11.1%	572.50	8.0%
Score 9	764.00	27.2%	2401.50	37.3%	2709.75	35.7%	3284.75	46.0%
Total	2811.75	100%	6434.00	100%	7583.50	100%	7145.00	100%

Table 3.5.2 RHA_J Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	5.80	4.08	9.22	7.31
Score 1	5.88	4.76	4.80	4.90
Score 2	6.93	5.85	5.39	4.92
Score 3	7.72	5.91	7.76	7.19
Score 4	9.33	7.46	8.83	6.74
Score 5	6.08	7.81	9.26	7.41
Score 6	12.86	8.62	11.08	7.57
Score 7	8.87	10.59	11.99	12.12
Score 8	11.29	16.92	14.06	11.93
Score 9	16.98	33.35	38.17	43.22
Total	9.37	10.89	12.64	12.56

Table 3.5.3 RHA_J Mean Service Hours

RHA_M

	9406		9412		9506		9512	
Score 0	87	14.7%	224	17.3%	227	15.7%	149	11.2%
Score 1	66	11.2%	166	12.8%	169	11.7%	137	10.3%
Score 2	50	8.5%	134	10.3%	146	10.1%	133	10.0%
Score 3	71	12.0%	167	12.9%	174	12.0%	171	12.9%
Score 4	41	6.9%	108	8.3%	137	9.5%	151	11.4%
Score 5	50	8.5%	84	6.5%	124	8.6%	130	9.8%
Score 6	21	3.6%	62	4.8%	65	4.5%	74	5.6%
Score 7	68	11.5%	110	8.5%	120	8.3%	109	8.2%
Score 8	66	11.2%	117	9.0%	120	8.3%	110	8.3%
Score 9	70	11.9%	126	9.7%	164	11.3%	163	12.3%
Total	590	100%	1298	100%	1446	100%	1327	100%

Table 3.6.1 RHA_M Client Count and Percentage

	9406		9412		9506		9512	
Score 0	443.00	6.4%	991.75	6.8%	1265.00	6.5%	640.75	3.3%
Score 1	329.50	4.7%	791.25	5.4%	1107.25	5.7%	751.75	3.9%
Score 2	320.50	4.6%	735.50	5.1%	901.00	4.6%	688.25	3.5%
Score 3	439.50	6.3%	1028.50	7.1%	1218.75	6.3%	1144.75	5.9%
Score 4	277.75	4.0%	795.50	5.5%	921.25	4.7%	1095.25	5.6%
Score 5	423.50	6.1%	899.50	6.2%	1470.25	7.6%	1749.50	9.0%
Score 6	322.00	4.6%	582.75	4.0%	629.75	3.2%	759.25	3.9%
Score 7	636.50	9.1%	884.50	6.1%	1379.75	7.1%	1322.50	6.8%
Score 8	897.75	12.9%	1702.75	11.7%	2538.50	13.1%	2673.75	13.7%
Score 9	2881.75	41.3%	6118.00	42.1%	8018.75	41.2%	8640.75	44.4%
Total	6971.75	100%	14530.00	100%	19450.25	100%	19466.50	100%

Table 3.6.2 RHA_M Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	5.09	4.43	5.57	4.30
Score 1	4.99	4.77	6.55	5.49
Score 2	6.41	5.49	6.17	5.17
Score 3	6.19	6.16	7.00	6.69
Score 4	6.77	7.37	6.72	7.25
Score 5	8.47	10.71	11.86	13.46
Score 6	15.33	9.40	9.69	10.26
Score 7	9.36	8.04	11.50	12.13
Score 8	13.60	14.55	21.15	24.31
Score 9	41.17	48.56	48.89	53.01
Total	11.82	11.19	13.45	14.67

Table 3.6.3 RHA_M Mean Service Hours

RHA_P

	9406		9412		9506		9512	
Score 0	86	5.9%	139	4.6%	155	3.8%	123	3.2%
Score 1	140	9.6%	292	9.7%	363	9.0%	293	7.5%
Score 2	119	8.1%	255	8.4%	320	7.9%	293	7.5%
Score 3	227	15.5%	398	13.2%	566	14.0%	534	13.7%
Score 4	150	10.3%	343	11.4%	465	11.5%	456	11.7%
Score 5	142	9.7%	298	9.9%	408	10.1%	389	10.0%
Score 6	84	5.7%	174	5.8%	233	5.8%	214	5.5%
Score 7	135	9.2%	299	9.9%	416	10.3%	420	10.8%
Score 8	118	8.1%	286	9.5%	431	10.7%	449	11.5%
Score 9	262	17.9%	535	17.7%	689	17.0%	733	18.9%
Total	1463	100%	3019	100%	4046	100%	3904	100%

Table 3.7.1 RHA_P Client Count and Percentage

	9406		9412		9506		9512	
Score 0	611.25	1.6%	1181.00	1.2%	1185.25	1.8%	1250.75	1.9%
Score 1	1183.00	3.0%	2637.75	2.7%	3846.00	2.7%	3264.50	2.3%
Score 2	1002.75	2.6%	3246.50	3.3%	3771.00	2.6%	3685.00	2.6%
Score 3	2430.00	6.2%	5699.00	5.8%	8864.25	6.2%	8679.75	6.2%
Score 4	2076.00	5.3%	5206.00	5.3%	7379.50	5.1%	8059.50	5.8%
Score 5	1945.50	5.0%	5478.25	5.6%	10263.75	7.1%	7956.00	5.7%
Score 6	1236.50	3.2%	4915.50	5.0%	6427.75	4.5%	5762.00	4.1%
Score 7	3118.00	8.0%	8813.50	8.9%	15795.00	11.0%	14924.75	10.7%
Score 8	3717.50	9.5%	12441.25	12.6%	19910.75	13.9%	21065.25	15.1%
Score 9	21768.50	55.7%	48978.00	49.7%	66316.00	46.1%	65009.50	46.5%
Total	39089.00	100%	98596.75	100%	143759.25	100%	139657.00	100%

Table 3.7.2 RHA_P Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	7.11	8.50	7.65	10.17
Score 1	8.45	9.03	10.60	11.14
Score 2	8.43	12.73	11.78	12.58
Score 3	10.70	14.32	15.66	16.25
Score 4	13.84	15.18	15.87	17.67
Score 5	13.70	18.38	25.16	20.45
Score 6	14.72	28.25	27.59	26.93
Score 7	23.10	29.48	37.97	35.54
Score 8	31.50	43.50	46.20	46.92
Score 9	83.09	91.55	96.25	88.69
Total	26.72	32.66	35.53	35.77

Table 3.7.3 RHA_P Mean Service Hours

PROV

	9406		9412		9506		9512	
Score 0	955	12.3%	1490	11.5%	1651	10.6%	1372	9.1%
Score 1	952	12.2%	1564	12.1%	1723	11.1%	1579	10.5%
Score 2	736	9.5%	1294	10.0%	1460	9.4%	1402	9.3%
Score 3	1008	12.9%	1703	13.2%	2062	13.3%	2031	13.4%
Score 4	797	10.2%	1369	10.6%	1669	10.7%	1722	11.4%
Score 5	638	8.2%	1099	8.5%	1365	8.8%	1385	9.2%
Score 6	392	5.0%	668	5.2%	838	5.4%	821	5.4%
Score 7	684	8.8%	1143	8.8%	1416	9.1%	1375	9.1%
Score 8	585	7.5%	1009	7.8%	1306	8.4%	1318	8.7%
Score 9	1040	13.4%	1607	12.4%	2045	13.2%	2104	13.9%
Total	7787	100%	12946	100%	15535	100%	15109	100%

Table 3.8.1 PROV Client Count and Percentage

	9406		9412		9506		9512	
Score 0	5415.00	4.2%	8099.50	3.4%	10355.25	3.2%	7057.00	2.2%
Score 1	6576.50	5.1%	10332.50	4.4%	13118.25	4.1%	10571.50	3.4%
Score 2	5890.50	4.6%	10627.25	4.5%	11844.25	3.7%	11525.75	3.7%
Score 3	9038.75	7.1%	15981.00	6.8%	21807.50	6.8%	20418.25	6.5%
Score 4	8481.00	6.6%	15061.50	6.4%	20214.00	6.3%	19986.50	6.3%
Score 5	7600.50	5.9%	14982.50	6.4%	22147.25	6.9%	18915.25	6.0%
Score 6	5362.75	4.2%	11263.00	4.8%	14269.00	4.4%	13081.75	4.1%
Score 7	11558.75	9.0%	21267.75	9.1%	30676.25	9.5%	29239.25	9.3%
Score 8	13738.75	10.7%	27416.00	11.6%	39650.00	12.3%	42188.75	13.4%
Score 9	54299.00	42.4%	100361.75	42.6%	137561.50	42.8%	142358.25	45.1%
Total	127961.50	100%	235392.75	100%	321643.25	100%	315342.25	100%

Table 3.8.2 PROV Sum of Service Hours and Percentage

	9406	9412	9506	9512
Score 0	5.67	5.44	6.27	5.14
Score 1	6.91	6.61	7.61	6.70
Score 2	8.00	8.21	8.11	8.22
Score 3	8.97	9.38	10.58	10.05
Score 4	10.64	11.00	12.11	11.61
Score 5	11.91	13.63	16.23	13.66
Score 6	13.68	16.86	17.03	15.93
Score 7	16.90	18.61	21.66	21.26
Score 8	23.49	27.17	30.36	32.01
Score 9	52.21	62.45	67.27	67.66
Total	16.43	18.18	20.70	20.87

Table 3.8.3 PROV Mean Service Hours

Results indicated changes in frequency distributions over time. From 9406 to 9512, all regions, except for RHA_A, had lower numbers of clients with Combined Classification Scores of 0 to 2, the low end of the continuum. By 9512, all regions, with the exception of RHA_A and RHA_M, had greater numbers of clients with Combined Classification Scores of 7 to 9, those at the high end of the continuum.

Total service hours for all regions including the provincial caseload increased for the first three time periods. However, in 9512, regions and the provincial caseload experienced decreased total service hours. The exception to this was RHA_M which exhibited less than a one percent increase. From 9406 and 9512, clients with Combined Classification Scores of 0 to 2 experienced gradual reductions in total service hours. Over the same time period, clients with scores of 7 to 9 experienced increased total service hours, except for RHA_P, which decreased total hours for this same client group by one percent.

From 9406 to 9512, clients with scores of 0 to 2, except for those in RHA_D and RHA_P, experienced decreased mean service hours. Clients with scores from 7 to 9, except for those in RHA_G, experienced increased mean service hours from 9406 to 9506. However, from 9506 to 9512, RHA_A, RHA_D, RHA_G, RHA_P, and PROV showed reduced mean service hours for this client group.

In 9512, the minimum mean amount of service provided to clients with scores of 0 is 3.24 hours in RHA_G, 3.7 times less than the maximum mean amount of service at 12.12 hours provided clients with scores of 0 in RHA_D. In 9512, the minimum mean amount of service provided to clients with scores of 9 is 7.62 hours in RHA_G, 11.6 times less than the maximum mean amount of service at 88.69 hours provided to clients with scores of 9 in RHA_P.

PROV shows that, in 9512, clients with a Combined Classification Score of 9 received, on average, twice the amount of service hours as did clients with a Combined Classification Score of 8, three times the amount of service hours as clients with a Combined Classification Score of 7, and thirteen times the amount of service hours as did clients with a Combined Classification Score of 0. These ratios are similar for RHA_M and RHA_P. In 9512, RHA_G provided, on average, equal amounts of service hours to clients with Combined Classification Scores of 7 to 9, and clients with a Combined Classification Score of 0 received half the amount of service.

To evaluate the relationship between frequencies of client counts within the Combined Classification Scores by the four time periods for each region, this study employed a chi-square test of association. The detailed results of this crosstabs procedure are included in Appendices A to G. Table 3.9 summarizes chi-square values, the degrees of freedom, and the significance levels.

	X^2	df	p
RHA_A	19.220	27	0.862
RHA_D	30.070	27	0.311
RHA_G	22.114	27	0.732
RHA_J	16.745	27	0.937
RHA_M	61.977	27	0.000
RHA_P	63.655	27	0.000
PROV	134.741	27	0.000

Table 3.9 Chi-Square Test: Combined Classification Scores by Time Periods

The chi-square test provided a direct measure of whether the frequency of Combined Classification Scores and time periods were statistically related. The chi-square analysis indicated significant relationships for RHA_M, RHA_P, and PROV. However, further analysis, not completed by this study, is needed to determine the cause of the relationship.

This study used analysis of variance (ANOVA) to determine if any significant differences existed between the mean service hours provided to each group of clients within the Combined Classification Scores. Table 3.10 summarizes the results. Detailed information is illustrated in Appendices A to G.

	9406		9412		9506		9512	
	F	*p*	F	*p*	F	*p*	F	*p*
RHA_A	0.555	0.806	1.300	0.253	0.830	0.591	0.845	0.578
RHA_D	2.225	0.034	2.888	0.006	4.350	0.000	3.849	0.000
RHA_G	1.733	0.085	2.995	0.002	4.274	0.000	2.609	0.006
RHA_J	2.974	0.002	13.250	0.000	9.330	0.000	13.030	0.000
RHA_M	15.076	0.000	37.409	0.000	36.804	0.000	39.817	0.000
RHA_P	45.712	0.000	104.316	0.000	136.673	0.000	140.638	0.000
PROV	147.447	0.000	312.177	0.000	383.483	0.000	426.604	0.000

Table 3.10 ANOVA: Mean Service Hours by Combined Classification Score

Results indicated that, in 9406, the mean service hours provided within each of the Combined Classification scores, were significantly different for RHA_J, RHA_M, RHA_P, and PROV. By 9512, all regions except RHA_A displayed a significant F indicating their mean hours of service across Combined Classification scores were not equal.

CHAPTER FOUR

DISCUSSION AND CONCLUSION

Discussion

This study determined whether a relationship existed between Home Care Client Classification represented by the Combined Classification Score and resource use represented by the hours of Home Care Program service provided to long term care clients from June 1994 to December 1995. HCCC assumes that clients with higher HCCC scores, (i.e., those with greater needs and lower support from informal caregivers) require, and should use, more Home Care resources than clients with lower HCCC scores (i.e., those with lower functional needs and higher adequacy of informal support).

The null hypothesis, that no relationship existed between HCCC and resource use as identified by service hours, was rejected. This study found a positive relationship between the Combined Classification Score and hours of service, and clients with a higher Combined Classification Score received more hours of service than those with a lower Combined Classification Score.

Although the relationship between the Combined Classification Score and service hours for the provincial caseload improved over time from r_s of .325 in 9406 to r_s of .414 in 9512, $p = .01$, these findings for the provincial caseload were not as strong as that of the pilot sample noted in the *Home Care Client Classification (HCCC) System Final Report*. The pilot, based on a sample size of 201 clients, had a positive correlation of .52 (Alberta Health. March 1994. p.iv).

Managers must take into account many factors when allocating resources to clients. Coinciding with the implementation of HCCC, the Government of Alberta began a major restructuring of its health care system. On April 1, 1995, seventeen regional health authorities and two provincial health authorities replaced more than two hundred boards and administrations. Although the Minister of Health remains accountable to Albertans for setting strategic direction, legislation, performance measures, and standards, regional health authorities assumed responsibility for health service delivery in hospitals, continuing care facilities, community health services, public health services, as well as home care services. Health authorities are obligated to balance the demand for service within the framework of a fixed budget and allocate available resources based on local priorities. Distinct regional needs might have lead to variable criteria for resource allocation and this may have contributed to the weaker relationship found in this study between the Combined Classification Score and service hours as compared with the pilot sample.

Nevertheless, the improved relationship over time found by this study suggests that HCCC reinforced best practice. Throughout the four time periods, PROV (the provincial caseload), provided exponentially higher amounts of service for those with greater needs. In 9406, clients with scores of 9, on average, received 2.2 times as much service as clients with scores of 8 and 3 times the amount of service as clients with scores of 7. In 9512, clients with scores of 9 received 2.1 times as much service as clients with scores of 8 and 3.1 times the amount of service as clients with scores of 7. In 9406, clients with scores of 0, 1, and 2 received 9.2, 7.5, and 6.5 times less service on average than clients with scores of 9. By 9512, these clients received 13.1, 10.1, and 8.2 times less service on average than clients with scores of 9.

Those with higher needs received proportional increases in service hours and the provincial caseload indicates that clients with scores of 9 received 22.8% more mean hours of service over the four time periods. Clients with scores of 8 experienced a

26.6% increase in service hours, on average, while clients with scores of 7 received 20.5% more service hours, on average. Those with Combined Classification Scores of 0 and 1 experienced reduced average service hours by 10.3% and 3.1%, respectively. This suggests that as managers prioritized their limited resources to meet the needs of those at the high needs end of the continuum, access to service was becoming more difficult for those with lower needs.

The *Home Care Client Classification (HCCC) System Final Report* indicates Alberta Health plans to periodically reset the Combined Classification Score relative to the current caseload. The categories are to always represent one-tenth of the provincial caseload based on client count. Categories for the Functional Need Classification Score and the Informal Support Classification Score will not be reset and will reflect changes in the caseload over time. The plan for readjustment of the Combined Classification Score suggests an expected change in frequency distributions over time. Findings from the descriptive data in this study support this premise indicating that, over the four time periods, the majority of regions along with the provincial caseload experienced some shift in frequency distributions. Across the regions and the province, from 9406 to 9512, the number of clients with scores of 0 decreased by ranges of 0.2% to 13.0%. The number of clients with scores of 9 increased by ranges of 0.4% to 8.7% except in RHA_A and RHA_J where the number of clients with scores 9 decreased by 4.9% and 1.6% respectively.

To date, the Combined Classification Score has not been reset to reflect the current caseload. Instead, Alberta Health, in partnership with health authorities, is reviewing core data elements used in the assessment process and is considering the development of an integrated assessment and classification system to be used across a range of community care and continuing care programs (Alberta Health, March 1998).

This study used the chi-square test of association to evaluate the relationship between frequencies of client counts within the Combined Classification Score by the four time periods for each region. Results supported a relationship for the two largest regions and the provincial caseload, although chi-square does not indicate the cause of the relationship.

The *Home Care Client Classification (HCCC) System Final Report* concluded that the HCCC was applicable in all locations across Alberta as no significant differences were found between rural and urban health units, between health units of different sizes, and those in northern and southern Alberta (Alberta Health, March 1994, p.v). Regardless of where a client lived in Alberta, HCCC would expect that clients with Combined Classification Scores of 0 would receive less service than 90% of all other clients on the provincial caseload and clients with Combined Classification Scores of 9 would receive more service than 89% of all other clients on the provincial caseload. Based on their Combined Classification Score, clients would receive similar amounts of service regardless of where they resided in Alberta.

Although this research study found positive correlations between service hours and the Combined Classification Score, these correlations masked significant differences in the mean amount of service provided across regions specific to each Combined Classification Score. For example, in 9512, the mean amount of service provided to clients with scores of 0 in RHA_D was greater than the mean hours provided to clients with Combined Classification Scores of 9 in RHA_G. Clients in RHA_G with scores of 9 were not receiving service greater than 89% of all other clients on the provincial caseload, as expected by the *Home Care Client Classification (HCCC) System Final Report*. Also, in 9512, clients with classification scores of 9 in RHA_G received eight times less service, on average, than the provincial average. The regional differences found in this study caution against assuming that mean home care service hours based on the Combined Classification Score are uniformly provided across regions.

Given the current environment of fiscal restraint and the increasing demand from different client groups, it is likely that health authority administrators use various strategies to manage their limited resources. Distinct regional approaches may achieve effective local service delivery but may explain disparities in service hours provided to long term home care clients across the province.

From 9406 through 9506, proportionately more service hours, on average, were targeted to clients with higher needs as indicated by those with scores from 7 to 9. In 9512, clients in RHA_J, RHA_M and PROV experienced continued increases although PROV's increase was slight at 0.39 hours. However, clients with scores of 9 in RHA_A, RHA_D, and RHA_P experienced decreased average service hours from the previous time period. RHA_G displayed a general reduction in average hours for high needs clients across all time periods. Although the majority of clients with high needs across regions received increased average service hours until 9506, the decrease in 9512 might signal a developing gap between the resources available for home care services and the increasing numbers of clients with high needs requiring service. Health reform in Alberta was accompanied by restructuring which reduced administrative costs and allowed more funds to be targeted for direct service delivery. The stabilization and reduction pattern from 9506 to 9512 in average service hours provided to those with high needs suggests tightening resources. As cost savings from restructuring and increased efficiencies declined, fewer funds would have been available for continued expansion of services.

Clients receiving acute home care or palliative home care services impact available resources. Increasing demands from various client groups along with many other environmental factors must be taken into account by administrators when allocating funds. As noted in the literature review, trends including fewer institutional beds, changing demographics, and new technologies means more people with multiple care

needs are being supported in the community. Complex services that only hospitals previously administered are now being provided in the home and the general shift to more community-based care along with fewer institutional beds means more people with higher levels of chronicity and acuity must receive care in the home. Increased volumes of clients with acute care needs or palliative care needs impacts fixed budgets and the allocation of resources to those with long term care needs.

Conclusion

1) This study found a positive relationship between the Combined Classification Score and service hours provided to long term Home Care Program clients from June 1994 to December 1995.

2) Although the findings do not indicate causality, the importance of the positive relationship between the Combined Classification Score and resource use allows managers to use this information to prioritize service delivery within their home care program and region.

3) The higher a client's Combined Classification Score, the more likely the client is to receive greater amounts of service.

4) Over time, home care provided services to an increasing number of clients with higher needs.

5) The positive relationship between the Combined Classification Score and service hours masked differences in mean amounts of service provided across regions specific to a Combined Classification Score.

6) Clients with the same Combined Classification Score living in different parts of the province are likely to receive different amounts of service.

Limitations

1) The results of this study describe the relationship between the Combined Classification Score and service hours provided to clients receiving long term home care services from June 1994 to December 1995; therefore generalizations must be made with caution.

2) This study is not a comprehensive evaluation of HCCC.

3) As HCCC was designed to capture information about long term care clients only, the study did not examine the impact on resources of clients receiving short term or palliative home care services.

4) The study did not explore HCCC and resource use by the age of the client, by specific service types, or by cost.

5) The quality of the data may be questionable related to data entry errors and the different interpretations of coding categories.

6) Frequencies for the Combined Classification Score for RHA_A and RHA_D were relatively small.

7) Findings specific to the provincial caseload may be skewed by regions with large client counts and regions with small client counts.

8) This study is restricted by the researcher's limited time and resources.

Recommendations for Future Study and Research

1) A study considering the relationship between the four HCCC scores and resource use over expanded years.

2) A study considering classification scores and their relationship to specific types of home care services such as homemaking, personal care, direct professional services.

3) A study considering classification scores and their relationship to specific home care service providers such as nurses, social workers, personal care attendants, licensed practical nurses, physical therapists, occupational therapists, volunteers, nutritionists.

4) A study considering the relationship between classification scores and the age of the client, clients' perception of the quality of home care services, and clients' health outcomes.

5) A qualitative study about the usefulness of the HCCC System and its components as a management and administrative tool.

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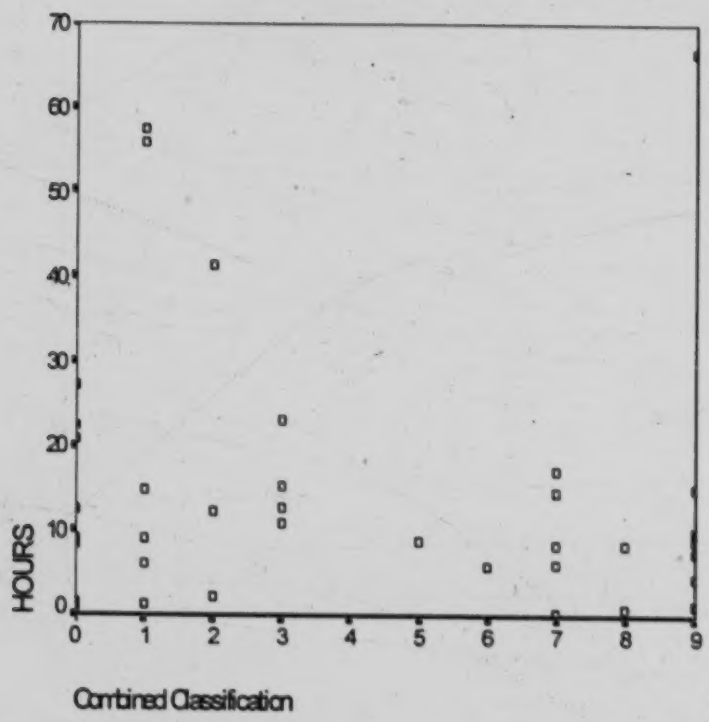
Appendix A: RHA_A

RHA_A June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HOURS	.251	42	.000	.722	42	.010**

**. This is an upper bound of the true significance.

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	-.094
		HOURS	-.094	1.000
	Sig. (2-tailed)	Combined Classification	.	.555
		HOURS	.555	.
	N	Combined Classification	42	42
		HOURS	42	42

Descriptives

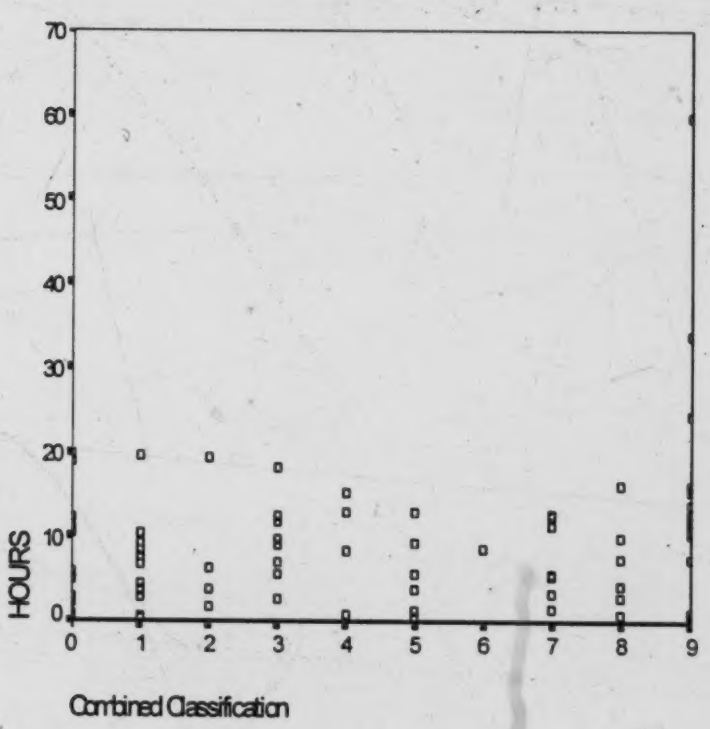
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	9	11.6667	9.9420	3.3140	4.0246	19.3088	.50	27.25
		1	6	24.2500	25.5568	10.4335	-2.5698	51.0698	1.50	57.50
		2	3	18.8333	20.2567	11.6952	-31.4876	69.1543	2.50	41.50
		3	4	15.6875	5.3672	2.6836	7.1471	24.2279	11.00	23.25
		5	1	9.0000	.	.	.	.	9.00	9.00
		6	1	6.0000	.	.	.	.	6.00	6.00
		7	5	9.4500	6.7115	3.0015	1.1168	17.7832	.50	17.25
		8	2	4.7500	5.3033	3.7500	-42.8983	52.3983	1.00	8.50
		9	11	14.0455	17.8192	5.3727	2.0744	26.0165	1.50	66.75
		Total	42	14.1905	15.1980	2.3451	9.4545	18.9265	.50	66.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	1122.985	8	140.373	.555	.806
	Within Groups	8347.116	33	252.943		
	Total	9470.101	41			

RHA A December 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.153	79	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.134
		HOURS	.134	1.000
	Sig. (2-tailed)	Combined Classification	.	.238
		HOURS	.238	.
	N	Combined Classification	79	79
		HOURS	79	79

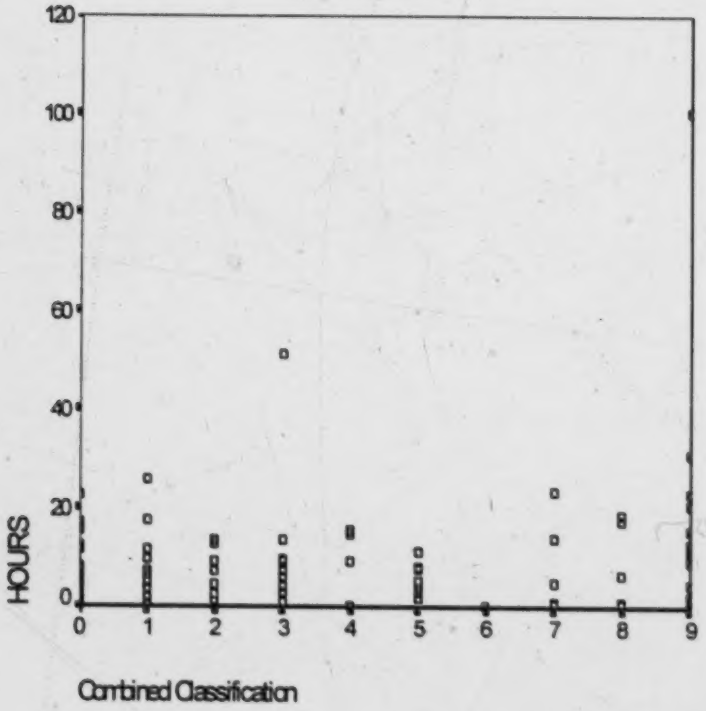
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	13	9.4808	7.0011	1.9418	5.2501	13.7115	.50	20.00
		1	12	6.6875	5.2820	1.5248	3.3315	10.0435	.50	19.75
		2	5	6.8000	7.3366	3.2810	-2.3094	15.9094	2.00	19.50
		3	8	9.7813	4.8134	1.7018	5.7572	13.8053	2.75	18.50
		4	4	9.5625	6.4108	3.2054	-.6384	19.7634	1.00	15.50
		5	6	5.7917	4.8255	1.9700	.7277	10.8556	.75	13.25
		6	1	8.7500	.	.	.	.	8.75	8.75
		7	7	7.6786	4.6496	1.7574	3.3784	11.9787	1.75	13.00
		8	7	6.2500	5.5827	2.1101	1.0869	11.4131	1.00	16.25
		9	16	15.2969	14.5465	3.6366	7.5456	23.0482	.50	59.75
		Total	79	9.3639	8.6613	.9745	7.4239	11.3040	.50	59.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	848.456	9	94.273	1.300	.253
	Within Groups	5003.019	69	72.508		
	Total	5851.475	78			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.225	91	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.103
		HOURS	.103	1.000
	Sig. (2-tailed)	Combined Classification	.	.334
		HOURS	.334	.
	N	Combined Classification	91	91
		HOURS	91	91

Descriptives

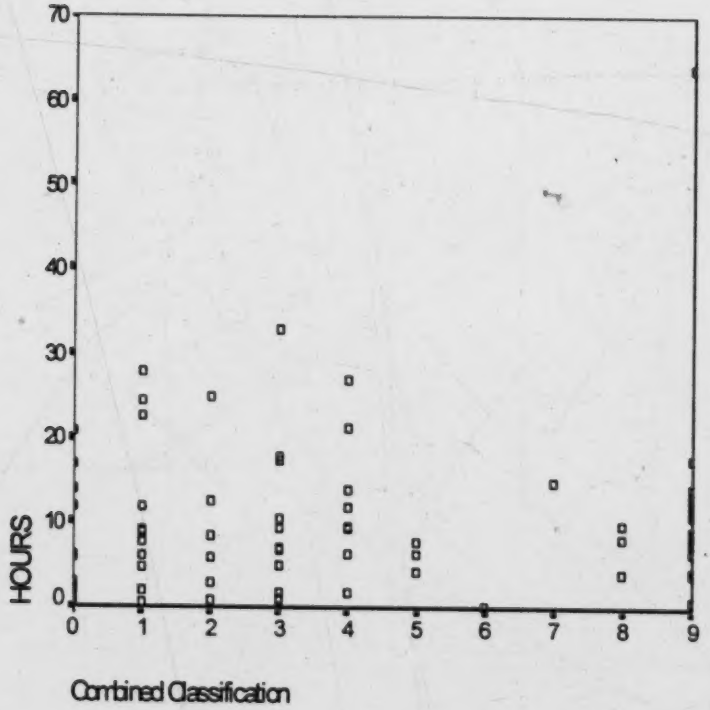
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	21	7.4881	6.4660	1.4110	4.5448	10.4314	.75	23.00
		1	13	8.7885	7.0207	1.9472	4.5459	13.0310	1.00	26.00
		2	8	6.6875	5.1906	1.8351	2.3481	11.0269	.25	14.00
		3	9	12.0278	15.3707	5.1236	.2129	23.8427	1.25	51.75
		4	4	10.2500	7.0267	3.5134	-.9309	21.4309	.50	15.75
		5	7	6.1786	3.2873	1.2425	3.1383	9.2188	2.25	11.50
		6	1	.5000	.	.	.	.	.50	.50
		7	6	10.0417	9.0518	3.6954	.5425	19.5408	1.00	23.75
		8	6	7.9167	8.4774	3.4609	-.9797	16.8130	1.00	19.00
		9	16	16.7188	24.0579	6.0145	3.8992	29.5383	.25	100.50
		Total	91	9.8159	12.6422	1.3253	7.1831	12.4488	.25	100.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	1214.331	9	134.926	.830	.591
	Within Groups	13170.0	81	162.593		
	Total	14384.4	90			

RHA A December 1995

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.159	80	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.228*
		HOURS	.228*	1.000
	Sig. (2-tailed)	Combined Classification	.	.042
		HOURS	.042	.
	N	Combined Classification	80	80
		HOURS	80	80

*. Correlation is significant at the .05 level (2-tailed).

Descriptives

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	17	6.1176	6.5504	1.5887	2.7498	9.4855	.50	21.00
		1	11	11.6136	9.2867	2.8000	5.3748	17.8525	.75	28.00
		2	6	9.3750	8.7002	3.5518	.2448	18.5052	1.00	25.00
		3	12	9.4792	9.4583	2.7304	3.4696	15.4887	1.00	33.00
		4	8	12.7813	8.0705	2.8533	6.0342	19.5283	2.00	27.00
		5	4	5.8750	1.7017	.8509	3.1672	8.5828	4.50	8.00
		6	1	.2500	.	.	.	.	.25	.25
		7	1	15.0000	.	.	.	.	15.00	15.00
		8	3	7.5000	2.9475	1.7017	.1780	14.8220	4.25	10.00
		9	17	12.8971	13.7869	3.3438	5.8085	19.9856	1.00	64.00
		Total	80	9.8063	9.5026	1.0624	7.6916	11.9209	.25	64.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	698.911	9	77.657	.845	.578
	Within Groups	6434.711	70	91.924		
	Total	7133.622	79			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	9	13	21	17	60
		Expected Count	8.6	16.2	18.7	16.4	60.0
		% of Month	21.4%	16.5%	23.1%	21.3%	20.5%
	1	Count	6	12	13	11	42
		Expected Count	6.0	11.4	13.1	11.5	42.0
		% of Month	14.3%	15.2%	14.3%	13.8%	14.4%
	2	Count	3	5	8	6	22
		Expected Count	3.2	6.0	6.9	6.0	22.0
		% of Month	7.1%	6.3%	8.8%	7.5%	7.5%
	3	Count	4	8	9	12	33
		Expected Count	4.7	8.9	10.3	9.0	33.0
		% of Month	9.5%	10.1%	9.9%	15.0%	11.3%
	4	Count	0	4	4	8	16
		Expected Count	2.3	4.3	5.0	4.4	16.0
		% of Month	.0%	5.1%	4.4%	10.0%	5.5%
	5	Count	1	6	7	4	18
		Expected Count	2.6	4.9	5.6	4.9	18.0
		% of Month	2.4%	7.6%	7.7%	5.0%	6.2%
	6	Count	1	1	1	1	4
		Expected Count	.6	1.1	1.2	1.1	4.0
		% of Month	2.4%	1.3%	1.1%	1.3%	1.4%
	7	Count	5	7	6	1	19
		Expected Count	2.7	5.1	5.9	5.2	19.0
		% of Month	11.9%	8.9%	6.6%	1.3%	6.5%
	8	Count	2	7	6	3	18
		Expected Count	2.6	4.9	5.6	4.9	18.0
		% of Month	4.8%	8.9%	6.6%	3.8%	6.2%
	9	Count	11	16	16	17	60
		Expected Count	8.6	16.2	18.7	16.4	60.0
		% of Month	26.2%	20.3%	17.6%	21.3%	20.5%
Total		Count	42	79	91	80	292
		Expected Count	42.0	79.0	91.0	80.0	292.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

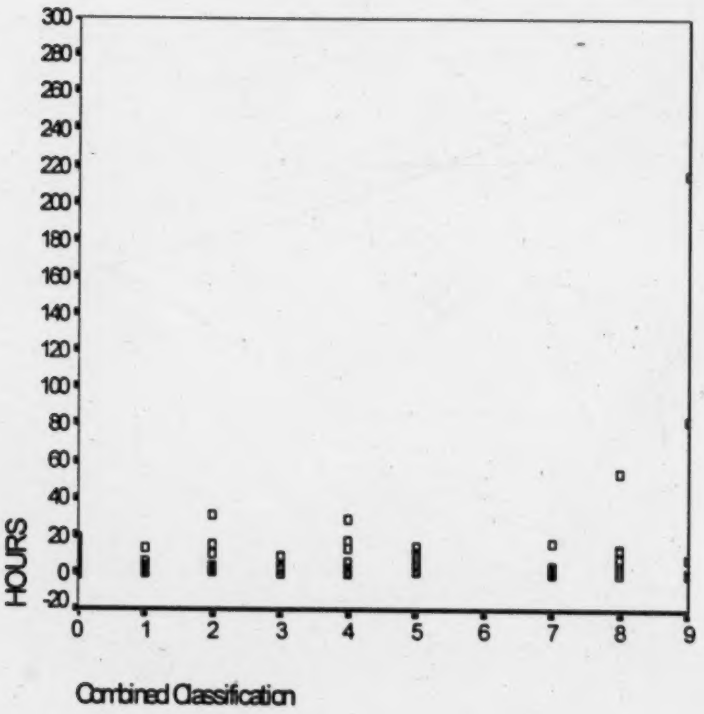
	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	19.220[a]	27	.862
Likelihood Ratio	22.383	27	.718
Linear-by-Linear Association	2.210	1	.137
N of Valid Cases	292		

a. 17 cells (42.5%) have expected count less than 5. The minimum expected count is .58.

APPENDIX B: RHA_D

RHA_D June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.351	88	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.053
		HOURS	.053	1.000
	Sig. (2-tailed)	Combined Classification	.	.623
		HOURS	.623	.
	N	Combined Classification	88	88
		HOURS	88	88

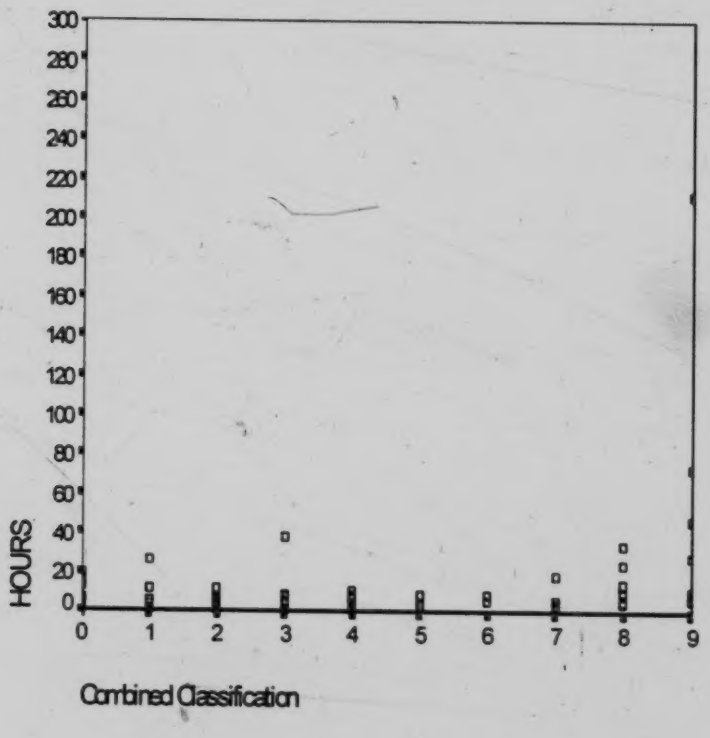
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	21	5.2738	5.3531	1.1681	2.8371	7.7105	-.25	19.00
		1	12	3.5417	3.7155	1.0726	1.1810	5.9024	.25	14.00
		2	10	7.6750	9.5649	3.0247	.8327	14.5173	1.50	31.50
		3	9	3.1111	2.9715	.9905	.8270	5.3952	.50	10.00
		4	9	8.5000	10.2003	3.4001	.6593	16.3407	.50	30.00
		5	7	6.8571	5.6915	2.1512	1.5934	12.1208	1.00	15.25
		7	6	5.0000	6.3186	2.5796	-1.6309	11.6309	.50	17.50
		8	7	14.1429	18.5044	6.9940	-2.9708	31.2565	.50	54.50
		9	7	44.3571	81.2811	30.7214	-30.8150	119.5292	.50	215.50
		Total	88	9.3409	25.0458	2.6699	4.0342	14.6476	-.25	215.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	10035.0	8	1254.370	2.225	.034
	Within Groups	44539.6	79	563.792		
	Total	54574.5	87			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.337	84	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.385**
		HOURS	.385**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	84	84
		HOURS	84	84

**. Correlation is significant at the .01 level (2-tailed).

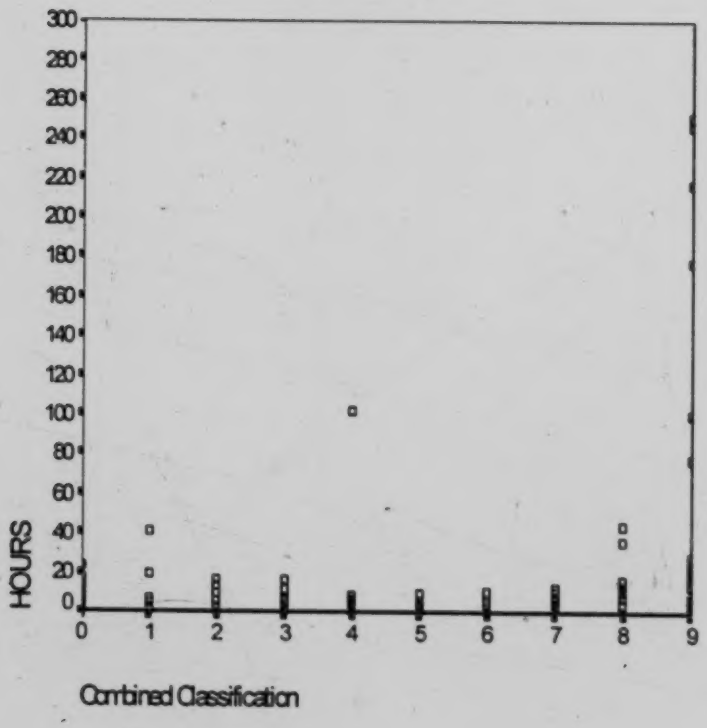
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	17	5.2353	5.9990	1.4550	2.1509	8.3197	.25	20.00
		1	10	5.6750	8.3816	2.6505	-.3208	11.6708	.50	27.25
		2	11	5.9091	3.0522	.9203	3.8586	7.9596	.50	12.00
		3	12	7.1042	10.1318	2.9248	.6667	13.5416	1.25	38.25
		4	9	4.7500	3.9091	1.3030	1.7452	7.7548	.50	11.25
		5	3	5.1667	3.4034	1.9650	-3.2880	13.6213	2.50	9.00
		6	2	7.5000	2.1213	1.5000	-11.5593	26.5593	6.00	9.00
		7	5	7.0500	7.0076	3.1339	-1.6509	15.7509	2.25	19.25
		8	7	15.3571	10.5740	3.9966	5.5779	25.1364	5.75	34.50
		9	8	48.8125	70.5171	24.9315	-10.1411	107.7661	.25	212.00
		Total	84	10.7440	24.9563	2.7230	5.3282	16.1599	.25	212.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	13437.5	9	1493.061	2.888	.006
	Within Groups	38256.2	74	516.976		
	Total	51693.7	83			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.358	122	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.373**
		HOURS	.373**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	122	122
		HOURS	122	122

**. Correlation is significant at the .01 level (2-tailed).

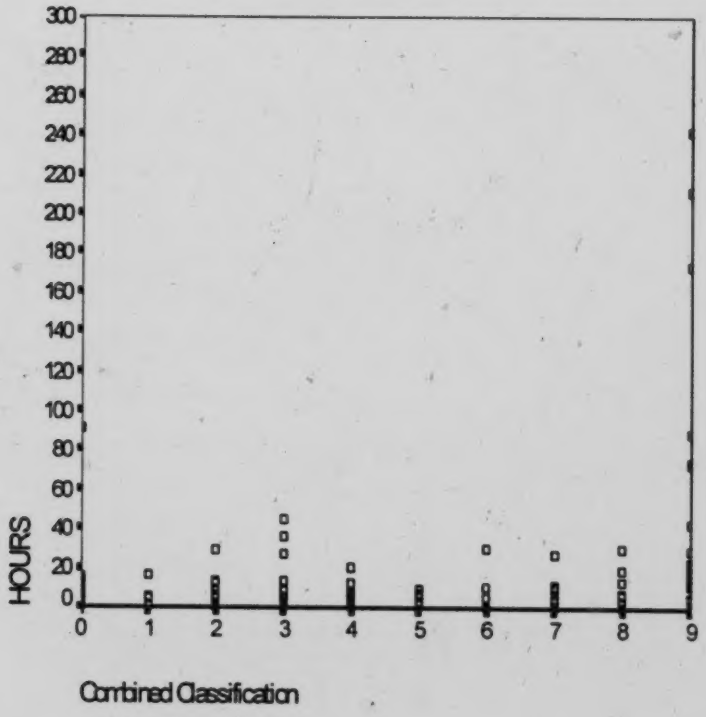
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	16	6.9219	6.8195	1.7049	3.2880	10.5557	1.00	24.25
		1	9	9.5556	13.3105	4.4368	-.6758	19.7869	1.00	41.50
		2	13	5.7308	5.1675	1.4332	2.6081	8.8534	.25	17.00
		3	17	4.7353	4.5229	1.0970	2.4098	7.0608	.75	17.50
		4	13	11.7885	27.4844	7.6228	-4.8202	28.3971	.25	102.75
		5	8	4.0000	3.1024	1.0969	1.4063	6.5937	.75	10.75
		6	7	4.6786	3.8910	1.4707	1.0800	8.2771	.50	11.00
		7	8	6.3125	4.1334	1.4614	2.8569	9.7681	2.75	13.25
		8	12	15.6042	12.7165	3.6709	7.5245	23.6839	4.25	45.00
		9	19	65.1842	88.5119	20.3060	22.5228	107.8456	3.50	251.00
		Total	122	16.7705	41.5650	3.7631	9.3204	24.2206	.25	251.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	54143.2	9	6015.910	4.350	.000
	Within Groups	154902	112	1383.057		
	Total	209046	121			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.336	138	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.224**
		HOURS	.224**	1.000
	Sig. (2-tailed)	Combined Classification	.	.008
		HOURS	.008	.
	N	Combined Classification	138	138
		HOURS	138	138

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	15	12.1167	22.6181	5.8400	-.4088	24.6422	.50	92.00
		1	7	5.0714	5.7802	2.1847	-.2743	10.4172	1.25	17.50
		2	16	7.7188	7.1390	1.7848	3.9146	11.5229	.50	29.50
		3	23	8.2065	12.1561	2.5347	2.9498	13.4632	.50	46.00
		4	18	5.6806	4.9711	1.1717	3.2085	8.1526	1.50	21.50
		5	13	3.6923	3.1344	.8693	1.7982	5.5864	.50	10.25
		6	6	8.4583	11.7860	4.8116	-3.9102	20.8268	.50	31.00
		7	10	8.2500	8.1420	2.5747	2.4256	14.0744	.50	28.25
		8	7	12.2857	10.3274	3.9034	2.7345	21.8369	1.25	30.75
		9	23	48.3478	69.2073	14.4307	18.4203	78.2753	.75	242.50
		Total	138	14.5725	33.2526	2.8307	8.9750	20.1699	.50	242.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	32266.6	9	3585.174	3.849	.000
	Within Groups	119219	128	931.402		
	Total	151486	137			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	21	17	16	15	69
		Expected Count	14.1	13.4	19.5	22.0	69.0
		% of Month	23.9%	20.2%	13.1%	10.9%	16.0%
	1	Count	12	10	9	7	38
		Expected Count	7.7	7.4	10.7	12.1	38.0
		% of Month	13.6%	11.9%	7.4%	5.1%	8.8%
	2	Count	10	11	13	16	50
		Expected Count	10.2	9.7	14.1	16.0	50.0
		% of Month	11.4%	13.1%	10.7%	11.6%	11.6%
	3	Count	9	12	17	23	61
		Expected Count	12.4	11.9	17.2	19.5	61.0
		% of Month	10.2%	14.3%	13.9%	16.7%	14.1%
	4	Count	9	9	13	18	49
		Expected Count	10.0	9.5	13.8	15.7	49.0
		% of Month	10.2%	10.7%	10.7%	13.0%	11.3%
	5	Count	7	3	8	13	31
		Expected Count	6.3	6.0	8.8	9.9	31.0
		% of Month	8.0%	3.6%	6.6%	9.4%	7.2%
	6	Count	0	2	7	6	15
		Expected Count	3.1	2.9	4.2	4.8	15.0
		% of Month	.0%	2.4%	5.7%	4.3%	3.5%
	7	Count	6	5	8	10	29
		Expected Count	5.9	5.6	8.2	9.3	29.0
		% of Month	6.8%	6.0%	6.6%	7.2%	6.7%
	8	Count	7	7	12	7	33
		Expected Count	6.7	6.4	9.3	10.5	33.0
		% of Month	8.0%	8.3%	9.8%	5.1%	7.6%
	9	Count	7	8	19	23	57
		Expected Count	11.6	11.1	16.1	18.2	57.0
		% of Month	8.0%	9.5%	15.6%	16.7%	13.2%
Total		Count	88	84	122	138	432
		Expected Count	88.0	84.0	122.0	138.0	432.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

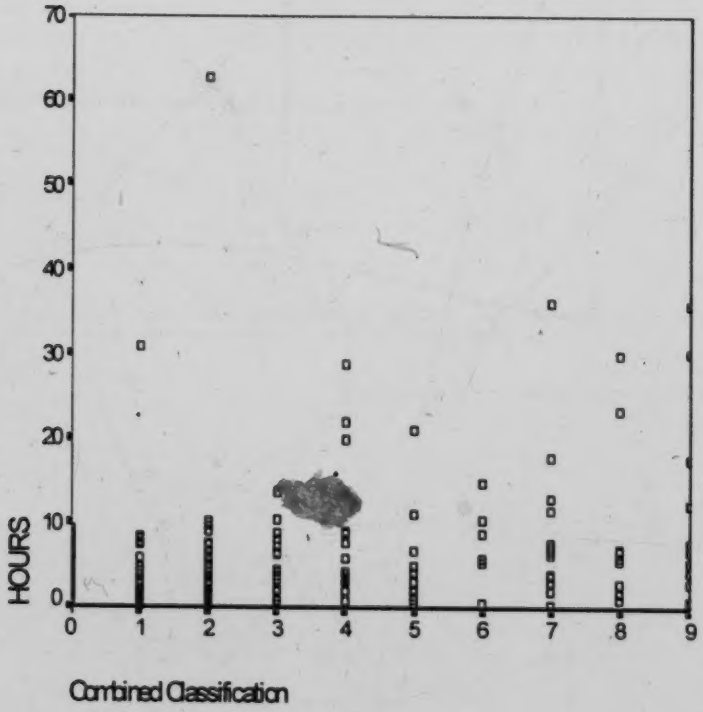
	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	30.070[a]	27	.311
Likelihood Ratio	33.293	27	.188
Linear-by-Linear Association	12.300	1	.000
N of Valid Cases	432		

a. 4 cells (10.0%) have expected count less than 5. The minimum expected count is 2.92.

APPENDIX C: RHA_G

RHA_G June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.218	185	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.267**
		HOURS	.267**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	185	185
		HOURS	185	185

**. Correlation is significant at the .01 level (2-tailed).

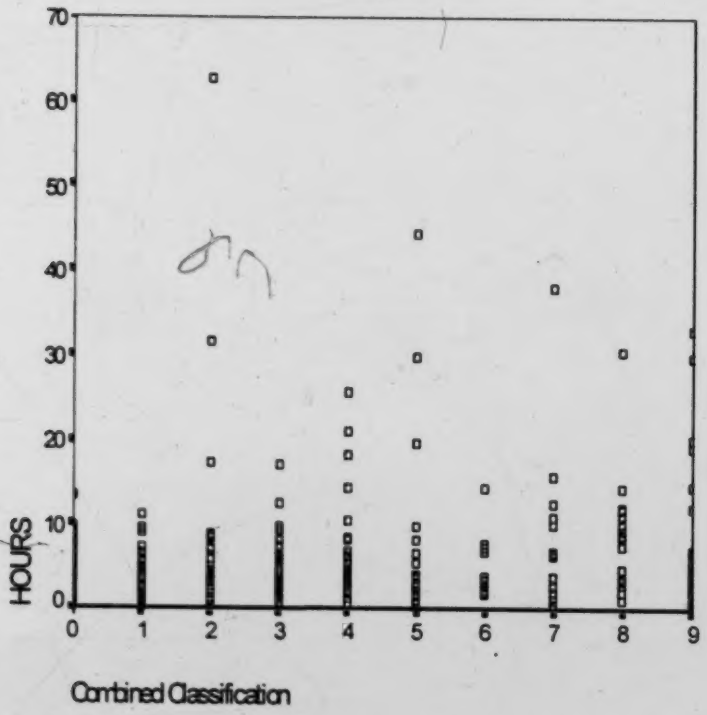
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	33	3.9318	2.6607	.4632	2.9884	4.8753	.50	9.50
		1	28	4.4286	5.7493	1.0865	2.1992	6.6579	.25	31.00
		2	29	6.0517	11.3160	2.1013	1.7474	10.3561	.25	62.75
		3	21	4.7857	3.8432	.8387	3.0363	6.5351	.50	13.75
		4	20	8.1500	7.4769	1.6719	4.6507	11.6493	1.00	29.00
		5	13	5.2885	5.5385	1.5361	1.9416	8.6354	.75	21.25
		6	6	7.8333	4.9032	2.0017	2.6878	12.9789	.75	15.00
		7	14	9.0536	9.1300	2.4401	3.7820	14.3251	.50	36.25
		8	9	9.5556	10.1163	3.3721	1.7795	17.3317	1.25	30.00
		9	12	10.8958	11.4894	3.3167	3.5958	18.1958	.75	36.00
		Total	185	6.2270	7.6570	.5630	5.1164	7.3377	.25	62.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	882.950	9	98.106	1.733	.085
	Within Groups	9904.765	175	56.599		
	Total	10787.7	184			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.223	317	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.266**
		HOURS	.266**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	317	317
		HOURS	317	317

**. Correlation is significant at the .01 level (2-tailed).

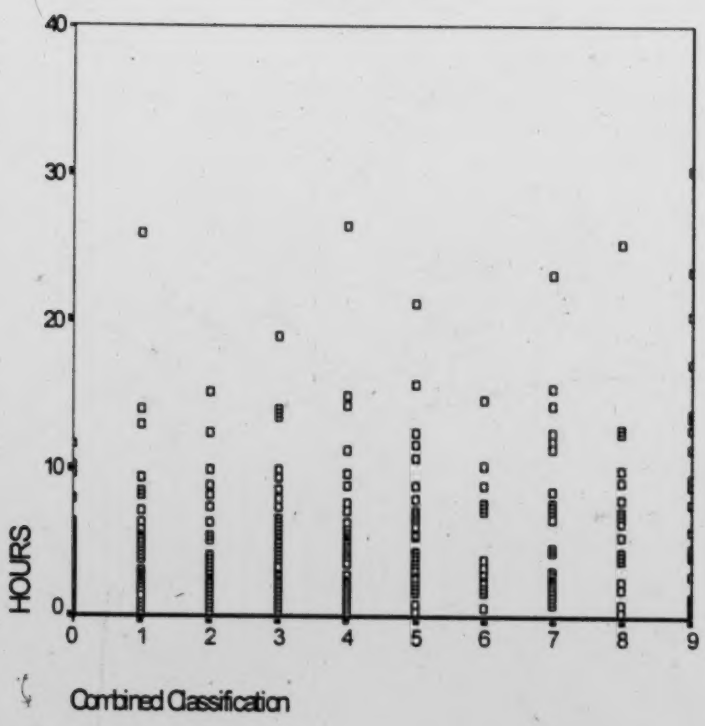
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	60	3.6083	2.7787	.3587	2.8905	4.3261	.25	13.50
		1	55	3.3545	2.5284	.3409	2.6710	4.0381	.25	11.25
		2	40	5.7250	10.7757	1.7038	2.2788	9.1712	.50	62.75
		3	39	4.2692	3.7052	.5933	3.0682	5.4703	.50	17.25
		4	33	6.5985	5.6991	.9921	4.5777	8.6193	.50	25.75
		5	23	7.2065	10.5399	2.1977	2.6487	11.7643	.25	44.50
		6	11	5.0909	3.8670	1.1659	2.4930	7.6888	2.00	14.50
		7	16	8.3594	9.0788	2.2697	3.5216	13.1971	.50	38.00
		8	19	6.4474	6.7724	1.5537	5.1832	11.7116	1.25	30.50
		9	21	8.8571	9.3710	2.0449	4.5915	13.1228	.25	33.00
		Total	317	5.4140	6.7669	.3801	4.6663	6.1618	.25	62.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	1167.817	9	129.757	2.995	.002
	Within Groups	13302.0	307	43.329		
	Total	14469.8	316			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.166	379	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.266**
		HOURS	.266**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	379	379
		HOURS	379	379

**. Correlation is significant at the .01 level (2-tailed).

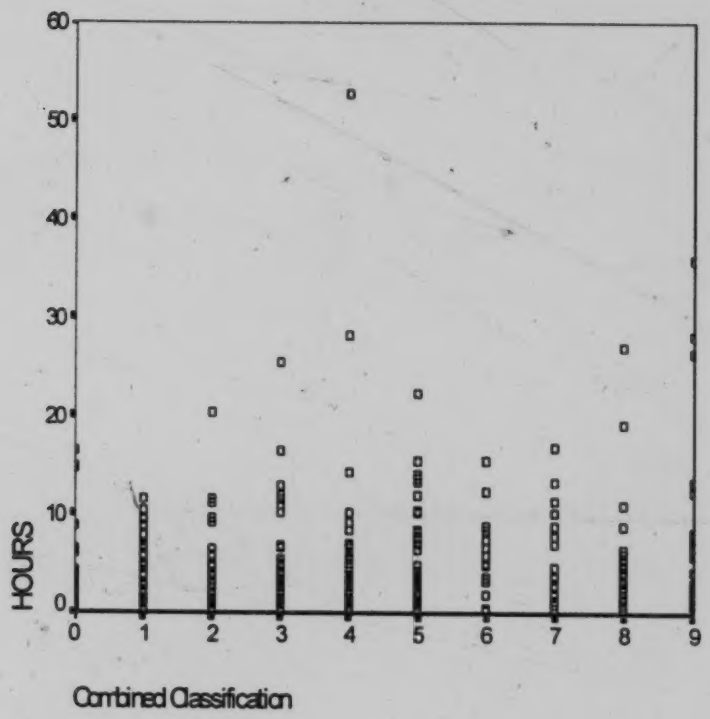
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	59	3.1525	2.7378	.3564	2.4391	3.8660	.25	11.75
		1	61	3.8852	4.1770	.5348	2.8155	4.9550	.25	26.00
		2	41	3.7012	3.3820	.5282	2.6337	4.7687	.50	15.25
		3	52	5.0192	4.2267	.5861	3.8425	6.1959	.50	19.00
		4	38	5.2303	5.1021	.8277	3.5532	6.9073	.25	26.50
		5	35	5.3143	4.5739	.7731	3.7431	6.8855	.50	21.25
		6	17	5.6324	3.8172	.9258	3.6697	7.5950	.75	14.75
		7	26	6.2404	5.6610	1.1102	3.9538	8.5269	1.00	23.25
		8	24	6.3854	5.2544	1.0725	4.1667	8.6041	.50	25.25
		9	26	8.8173	8.1910	1.6064	5.5089	12.1257	.25	30.25
		Total	379	4.9103	4.7952	.2463	4.4260	5.3946	.25	30.25

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	820.510	9	91.168	4.274	.000
	Within Groups	7871.315	369	21.331		
	Total	8691.825	378			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.205	367	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

Correlations

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.274**
		HOURS	.274**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	367	367
		HOURS	367	367

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	43	3.2384	3.9290	.5992	2.0292	4.4476	.25	16.50
		1	55	2.9727	2.9520	.3981	2.1747	3.7708	.25	11.75
		2	40	4.2563	3.9664	.6271	2.9877	5.5248	.25	20.50
		3	55	4.4455	4.6693	.6296	3.1832	5.7077	.25	25.50
		4	43	5.9244	8.7059	1.3276	3.2451	8.6037	.25	52.75
		5	47	5.5904	4.7186	.6883	4.2050	6.9758	.25	22.50
		6	14	6.1786	4.2680	1.1407	3.7143	8.6428	.50	15.50
		7	24	5.1563	4.5059	.9198	3.2536	7.0589	.25	17.00
		8	20	6.7875	6.4961	1.4526	3.7472	9.8278	.75	27.25
		9	26	7.6154	9.1551	1.7955	3.9176	11.3132	.50	36.00
		Total	367	4.8474	5.5867	.2916	4.2739	5.4209	.25	52.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	704.891	9	78.321	2.609	.006
	Within Groups	10718.3	357	30.023		
	Total	11423.2	366			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	33	60	59	43	195
		Expected Count	28.9	49.5	59.2	57.3	195.0
		% of Month	17.8%	18.9%	15.6%	11.7%	15.6%
	1	Count	28	55	61	55	199
		Expected Count	29.5	50.5	60.4	58.5	199.0
		% of Month	15.1%	17.4%	16.1%	15.0%	15.9%
	2	Count	29	40	41	40	150
		Expected Count	22.2	38.1	45.6	44.1	150.0
		% of Month	15.7%	12.6%	10.8%	10.9%	12.0%
	3	Count	21	39	52	55	167
		Expected Count	24.8	42.4	50.7	49.1	167.0
		% of Month	11.4%	12.3%	13.7%	15.0%	13.4%
	4	Count	20	33	38	43	134
		Expected Count	19.9	34.0	40.7	39.4	134.0
		% of Month	10.8%	10.4%	10.0%	11.7%	10.7%
	5	Count	13	23	35	47	118
		Expected Count	17.5	30.0	35.8	34.7	118.0
		% of Month	7.0%	7.3%	9.2%	12.8%	9.5%
	6	Count	6	11	17	14	48
		Expected Count	7.1	12.2	14.6	14.1	48.0
		% of Month	3.2%	3.5%	4.5%	3.8%	3.8%
	7	Count	14	16	26	24	80
		Expected Count	11.9	20.3	24.3	23.5	80.0
		% of Month	7.6%	5.0%	6.9%	6.5%	6.4%
	8	Count	9	19	24	20	72
		Expected Count	10.7	18.3	21.9	21.2	72.0
		% of Month	4.9%	6.0%	6.3%	5.4%	5.8%
	9	Count	12	21	26	26	85
		Expected Count	12.6	21.6	25.8	25.0	85.0
		% of Month	6.5%	6.6%	6.9%	7.1%	6.8%
Total		Count	185	317	379	367	1248
		Expected Count	185.0	317.0	379.0	367.0	1248.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

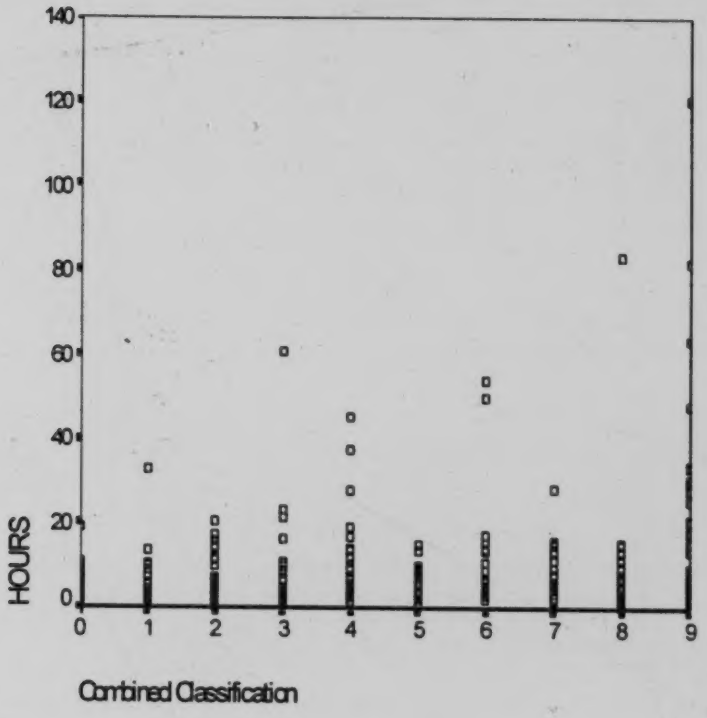
	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	22.114[a]	27	.732
Likelihood Ratio	22.006	27	.737
Linear-by-Linear Association	5.301	1	.021
N of Valid Cases	1248		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.12.

APPENDIX D: RHA_J

RHA_J June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.239	300	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.186**
		HOURS	.186**	1.000
	Sig. (2-tailed)	Combined Classification	.	.001
		HOURS	.001	.
	N	Combined Classification	300	300
		HOURS	300	300

**. Correlation is significant at the .01 level (2-tailed).

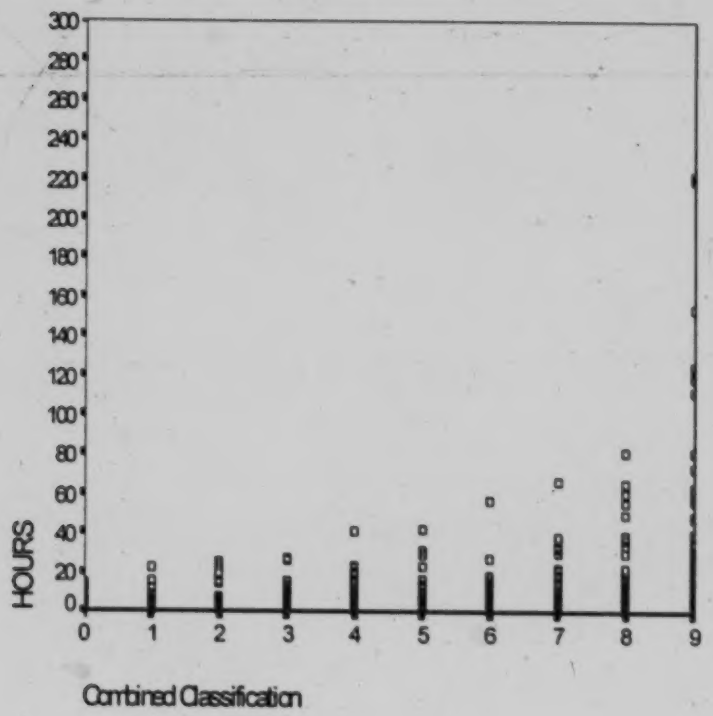
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	31	5.7984	4.0878	.7342	4.2990	7.2978	.25	19.50
		1	28	5.8750	6.4795	1.2245	3.3625	8.3875	.50	33.00
		2	36	6.9306	5.3092	.8849	5.1342	8.7269	.75	21.00
		3	35	7.7214	10.6282	1.7965	4.0705	11.3723	1.00	61.00
		4	39	9.3333	9.4754	1.5173	6.2618	12.4049	1.00	45.50
		5	21	6.0833	4.2230	.9215	4.1611	8.0056	.50	15.25
		6	18	12.8611	15.0936	3.5576	5.3552	20.3670	2.50	54.25
		7	29	8.8707	6.0834	1.1297	6.5567	11.1847	.25	28.50
		8	18	11.2917	18.6424	4.3941	2.0210	20.5623	.50	83.50
		9	45	16.9778	23.4235	3.4918	9.9406	24.0150	.75	120.50
		Total	300	9.3725	12.8485	.7418	7.9127	10.8323	.25	120.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	4171.325	9	463.481	2.974	.002
	Within Groups	45188.7	290	155.823		
	Total	49360.1	299			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.313	591	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.331**
		HOURS	.331**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	591	591
		HOURS	591	591

**. Correlation is significant at the .01 level (2-tailed).

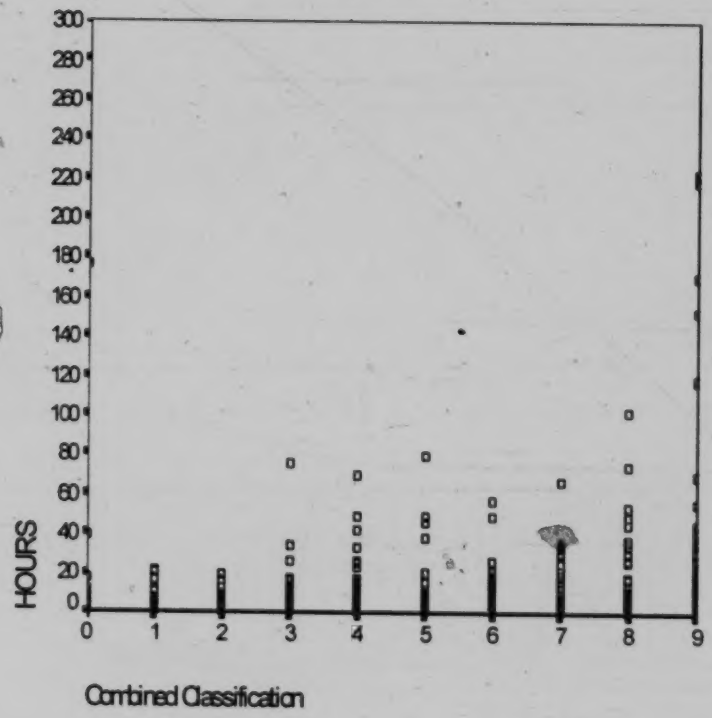
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	52	4.0817	3.2129	.4456	3.1872	4.9762	.50	15.00
		1	53	4.7642	4.1325	.5676	3.6251	5.9032	.50	23.50
		2	59	5.8517	5.7185	.7445	4.3615	7.3419	.50	25.50
		3	82	5.9085	4.7184	.5211	4.8718	6.9453	.50	27.50
		4	76	7.4605	6.4546	.7404	5.9856	8.9355	.50	41.50
		5	54	7.8102	8.0893	1.1008	5.6022	10.0181	.75	42.25
		6	35	8.6214	10.2592	1.7341	5.0973	12.1456	.25	57.25
		7	60	10.5917	11.4322	1.4759	7.6384	13.5449	.75	67.50
		8	48	16.9167	19.2450	2.7778	11.3285	22.5048	.50	81.75
		9	72	33.3542	51.9364	6.1208	21.1497	45.5586	.25	222.50
		Total	591	10.8866	21.7661	.8953	9.1282	12.6451	.25	222.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	47600.6	9	5288.959	13.250	.000
	Within Groups	231919	581	399.172		
	Total	279519	590			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.326	600	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.223**
		HOURS	.223**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	600	600
		HOURS	600	600

**. Correlation is significant at the .01 level (2-tailed).

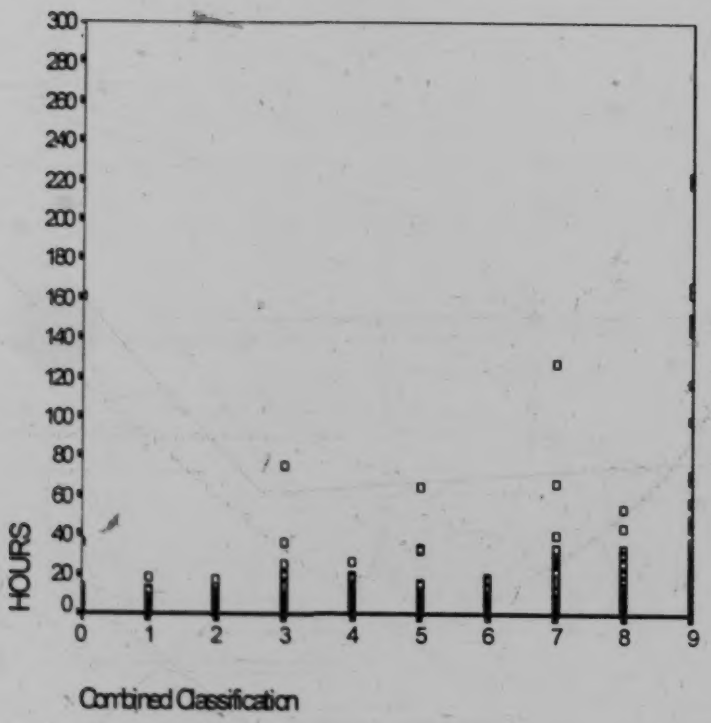
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	44	9.2159	26.5629	4.0045	1.1400	17.2918	.50	176.50
		1	43	4.8023	5.2186	.7958	3.1963	6.4084	.50	22.00
		2	54	5.3889	4.2261	.5751	4.2354	6.5424	.25	20.25
		3	85	7.7618	9.3493	1.0141	5.7452	9.7784	.25	75.50
		4	80	8.8344	11.1207	1.2433	6.3596	11.3092	.75	70.00
		5	58	9.2629	13.3511	1.7531	5.7524	12.7734	1.00	80.25
		6	39	11.0769	11.7672	1.8843	7.2624	14.8914	.50	57.00
		7	66	11.9924	12.6115	1.5524	8.8921	15.0927	.50	67.00
		8	60	14.0583	19.0812	2.4634	9.1291	18.9875	.25	102.75
		9	71	38.1655	65.3685	7.7578	22.6930	53.6380	.25	223.00
		Total	600	12.6392	27.4771	1.1217	10.4361	14.8422	.25	223.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	56343.2	9	6260.354	9.330	.000
	Within Groups	395898	590	671.013		
	Total	452241	599			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.338	569	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

Correlations

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.278**
		HOURS	.278**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	569	569
		HOURS	569	569

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	47	7.3085	23.6824	3.4544	.3551	14.2619	.25	161.75
		1	43	4.9012	3.6532	.5571	3.7769	6.0254	.25	18.75
		2	52	4.9231	3.8962	.5403	3.8384	6.0078	.50	18.25
		3	79	7.1899	9.7166	1.0932	5.0135	9.3663	.50	75.50
		4	71	6.7430	5.0771	.6025	5.5412	7.9447	.50	27.25
		5	59	7.4068	9.8144	1.2777	4.8491	9.9644	.25	65.50
		6	32	7.5703	5.2641	.9306	5.6724	9.4682	.75	19.25
		7	62	12.1210	19.1502	2.4321	7.2577	16.9842	.50	127.50
		8	48	11.9271	11.8701	1.7133	8.4804	15.3738	.75	54.75
		9	76	43.2204	66.8549	7.6688	27.9434	58.4974	.25	223.00
		Total	569	12.5571	29.4411	1.2342	10.1329	14.9813	.25	223.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	85371.2	9	9485.684	13.030	.000
	Within Groups	406959	559	728.013		
	Total	492330	568			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	31	52	44	47	174
		Expected Count	25.3	49.9	50.7	48.1	174.0
		% of Month	10.3%	8.8%	7.3%	8.3%	8.4%
	1	Count	28	53	43	43	167
		Expected Count	24.3	47.9	48.6	46.1	167.0
		% of Month	9.3%	9.0%	7.2%	7.6%	8.1%
	2	Count	36	59	54	52	201
		Expected Count	29.3	57.7	58.5	55.5	201.0
		% of Month	12.0%	10.0%	9.0%	9.1%	9.8%
	3	Count	35	82	85	79	281
		Expected Count	40.9	80.6	81.8	77.6	281.0
		% of Month	11.7%	13.9%	14.2%	13.9%	13.6%
	4	Count	39	76	80	71	266
		Expected Count	38.7	76.3	77.5	73.5	266.0
		% of Month	13.0%	12.9%	13.3%	12.5%	12.9%
	5	Count	21	54	58	59	192
		Expected Count	28.0	55.1	55.9	53.0	192.0
		% of Month	7.0%	9.1%	9.7%	10.4%	9.3%
	6	Count	18	35	39	32	124
		Expected Count	18.1	35.6	36.1	34.3	124.0
		% of Month	6.0%	5.9%	6.5%	5.6%	6.0%
	7	Count	29	60	66	62	217
		Expected Count	31.6	62.3	63.2	59.9	217.0
		% of Month	9.7%	10.2%	11.0%	10.9%	10.5%
	8	Count	18	48	60	48	174
		Expected Count	25.3	49.9	50.7	48.1	174.0
		% of Month	6.0%	8.1%	10.0%	8.4%	8.4%
	9	Count	45	72	71	76	264
		Expected Count	38.4	75.7	76.9	72.9	264.0
		% of Month	15.0%	12.2%	11.8%	13.4%	12.8%
Total		Count	300	591	600	569	2060
		Expected Count	300.0	591.0	600.0	569.0	2060.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

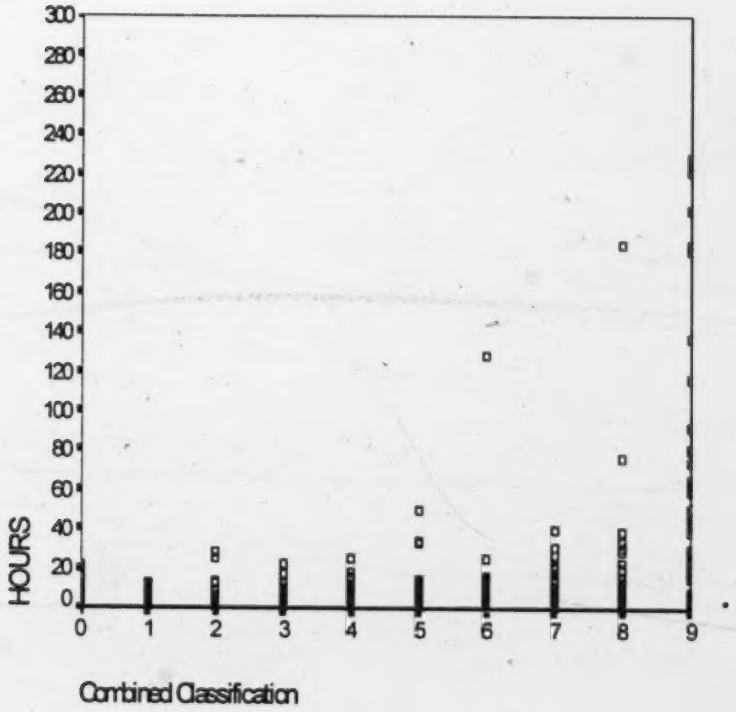
	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	16.745[a]	27	.937
Likelihood Ratio	16.882	27	.934
Linear-by-Linear Association	3.258	1	.071
N of Valid Cases	2060		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.06.

APPENDIX E: RHA_M

RHA_M June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.326	590	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.306**
		HOURS	.306**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	590	590
		HOURS	590	590

**. Correlation is significant at the .01 level (2-tailed).

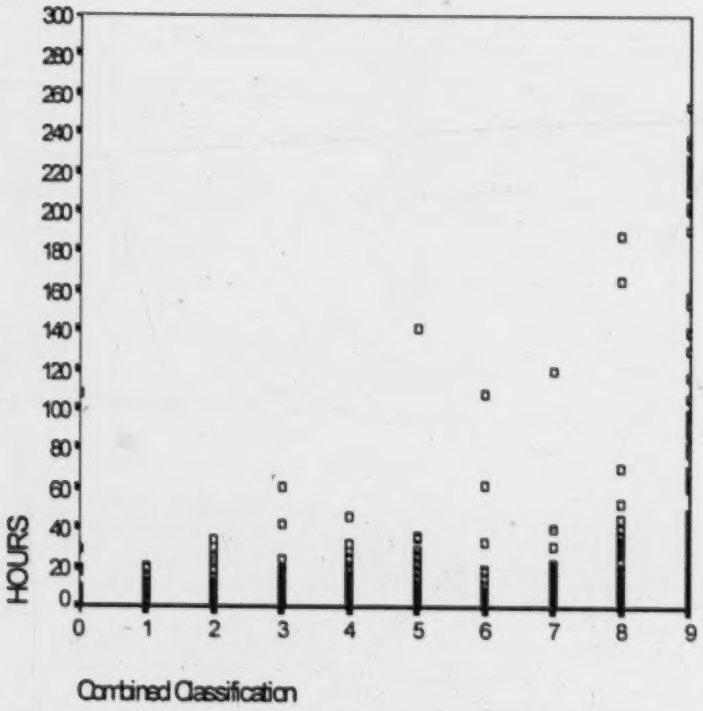
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	87	5.0920	3.7682	.4040	4.2888	5.8951	.50	22.25
		1	66	4.9924	3.1901	.3927	4.2082	5.7767	.50	13.00
		2	50	6.4100	5.5588	.7861	4.8302	7.9898	.25	28.75
		3	71	6.1901	4.3440	.5155	5.1619	7.2184	.75	23.25
		4	41	6.7744	5.8757	.9176	4.9198	8.6290	.50	25.75
		5	50	8.4700	9.0610	1.2814	5.8949	11.0451	.75	50.25
		6	21	15.3333	26.8158	5.8517	3.1269	27.5398	2.75	129.25
		7	68	9.3603	7.7662	.9418	7.4805	11.2401	.25	41.00
		8	66	13.6023	24.7447	3.0459	7.5193	19.6853	1.00	185.00
		9	70	41.1679	59.6919	7.1345	26.9348	55.4009	.25	228.50
		Total	590	11.8165	25.6562	1.0562	9.7421	13.8910	.25	228.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	73504.6	9	8167.173	15.076	.000
	Within Groups	314199	580	541.723		
	Total	387704	589			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.346	1298	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.322**
		HOURS	.322**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	1298	1298
		HOURS	1298	1298

**. Correlation is significant at the .01 level (2-tailed).

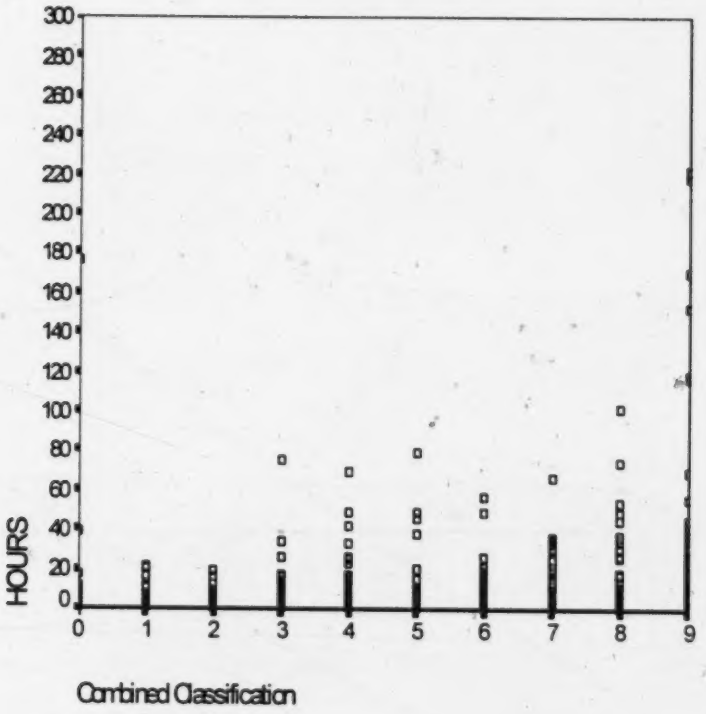
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	224	4.4275	7.8168	.5223	3.3982	5.4567	.25	108.50
		1	166	4.7666	3.5624	.2765	4.2206	5.3125	.50	20.75
		2	134	5.4888	5.2017	.4494	4.6000	6.3776	.25	34.75
		3	167	6.1587	6.6699	.5161	5.1397	7.1777	.25	61.75
		4	108	7.3657	7.3956	.7116	5.9550	8.7765	.25	47.00
		5	84	10.7083	16.8875	1.8426	7.0435	14.3731	.25	141.75
		6	62	9.3992	15.6317	1.9852	5.4295	13.3689	.75	108.25
		7	110	8.0409	12.6122	1.2025	5.6575	10.4243	.25	120.50
		8	117	14.5534	24.7401	2.2872	10.0233	19.0836	.50	188.25
		9	126	48.5556	70.8730	6.3139	36.0596	61.0515	.25	254.00
		Total	1298	11.1941	27.6718	.7681	9.6874	12.7009	.25	254.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	205808	9	22867.5	37.409	.000
	Within Groups	787343	1288	611.291		
	Total	993151	1297			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.326	600	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.223**
		HOURS	.223**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	600	600
		HOURS	600	600

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

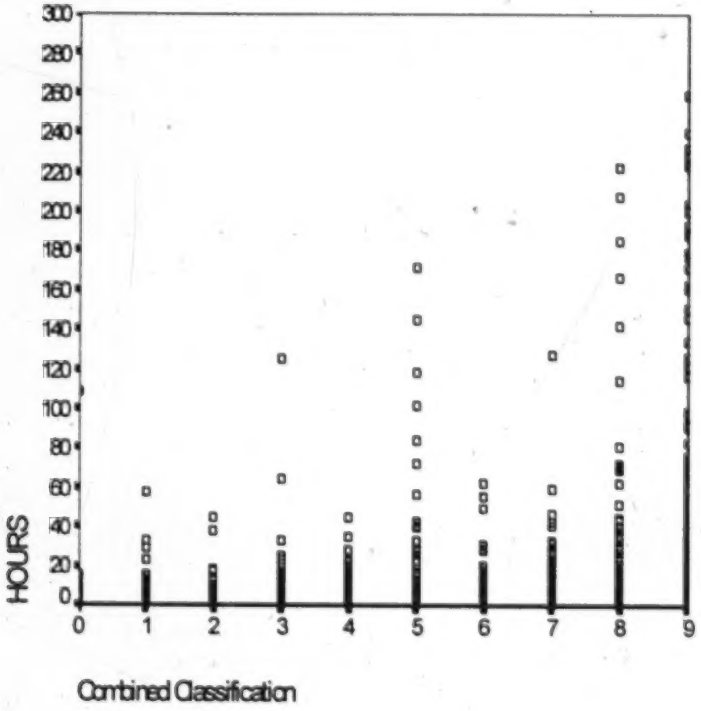
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	44	9.2159	26.5629	4.0045	1.1400	17.2918	.50	176.50
		1	43	4.8023	5.2186	.7958	3.1963	6.4084	.50	22.00
		2	54	5.3889	4.2261	.5751	4.2354	6.5424	.25	20.25
		3	85	7.7618	9.3493	1.0141	5.7452	9.7784	.25	75.50
		4	80	8.8344	11.1207	1.2433	6.3596	11.3092	.75	70.00
		5	58	9.2629	13.3511	1.7531	5.7524	12.7734	1.00	80.25
		6	39	11.0769	11.7672	1.8843	7.2624	14.8914	.50	57.00
		7	66	11.9924	12.6115	1.5524	8.8921	15.0927	.50	67.00
		8	60	14.0583	19.0812	2.4634	9.1291	18.9875	.25	102.75
		9	71	38.1655	65.3685	7.7578	22.6930	53.6380	.25	223.00
		Total	600	12.6392	27.4771	1.1217	10.4361	14.8422	.25	223.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	56343.2	9	6260.354	9.330	.000
	Within Groups	395898	590	671.013		
	Total	452241	599			

RHA M December 1995

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.332	1327	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.364**
		HOURS	.364**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	1327	1327
		HOURS	1327	1327

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	149	4.3003	9.0504	.7414	2.8352	5.7655	.25	109.00
		1	137	5.4872	6.6306	.5665	4.3670	6.6075	.50	58.00
		2	133	5.1748	5.6692	.4916	4.2024	6.1472	.25	46.00
		3	171	6.6944	11.6048	.8874	4.9426	8.4463	.25	126.00
		4	151	7.2533	6.7262	.5474	6.1718	8.3349	.25	45.75
		5	130	13.4577	25.6027	2.2455	9.0149	17.9005	.25	172.25
		6	74	10.2601	12.1831	1.4163	7.4375	13.0827	.50	63.25
		7	109	12.1330	15.9085	1.5238	9.1127	15.1534	.25	127.50
		8	110	24.3068	41.1559	3.9241	16.5295	32.0842	.50	223.50
		9	163	53.0107	69.5336	5.4463	42.2559	63.7656	.25	259.00
		Total	1327	14.6696	33.1087	.9089	12.8866	16.4526	.25	259.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	310908	9	34545.3	39.817	.000
	Within Groups	1142634	1317	867.603		
	Total	1453541	1326			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	87	224	227	149	687
		Expected Count	87.0	191.3	213.1	195.6	687.0
		% of Month	14.7%	17.3%	15.7%	11.2%	14.7%
	1	Count	66	166	169	137	538
		Expected Count	68.1	149.8	166.9	153.2	538.0
		% of Month	11.2%	12.8%	11.7%	10.3%	11.5%
	2	Count	50	134	146	133	463
		Expected Count	58.6	128.9	143.6	131.8	463.0
		% of Month	8.5%	10.3%	10.1%	10.0%	9.9%
	3	Count	71	167	174	171	583
		Expected Count	73.8	162.4	180.9	166.0	583.0
		% of Month	12.0%	12.9%	12.0%	12.9%	12.5%
	4	Count	41	108	137	151	437
		Expected Count	55.3	121.7	135.6	124.4	437.0
		% of Month	6.9%	8.3%	9.5%	11.4%	9.4%
	5	Count	50	84	124	130	388
		Expected Count	49.1	108.1	120.4	110.5	388.0
		% of Month	8.5%	6.5%	8.6%	9.8%	8.3%
	6	Count	21	62	65	74	222
		Expected Count	28.1	61.8	68.9	63.2	222.0
		% of Month	3.6%	4.8%	4.5%	5.6%	4.8%
	7	Count	68	110	120	109	407
		Expected Count	51.5	113.3	126.3	115.9	407.0
		% of Month	11.5%	8.5%	8.3%	8.2%	8.7%
	8	Count	66	117	120	110	413
		Expected Count	52.3	115.0	128.1	117.6	413.0
		% of Month	11.2%	9.0%	8.3%	8.3%	8.9%
	9	Count	70	126	164	163	523
		Expected Count	66.2	145.6	162.3	148.9	523.0
		% of Month	11.9%	9.7%	11.3%	12.3%	11.2%
Total		Count	590	1298	1446	1327	4661
		Expected Count	590.0	1298.0	1446.0	1327.0	4661.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

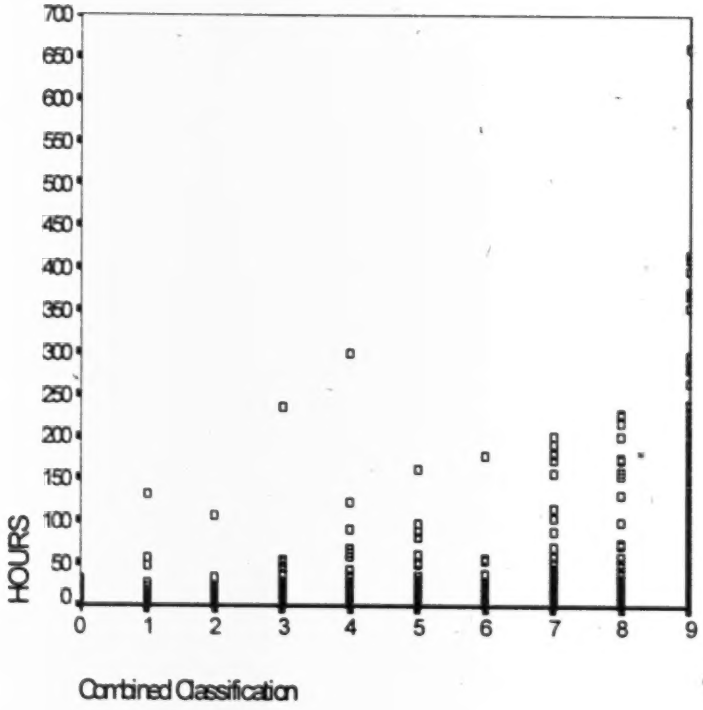
	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	61.977[a]	27	.000
Likelihood Ratio	62.498	27	.000
Linear-by-Linear Association	3.209	1	.073
N of Valid Cases	4661		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 28.10.

APPENDIX F: RHA_P

RHA_P June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.324	1463	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.330**
		HOURS	.330**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	1463	1463
		HOURS	1463	1463

**. Correlation is significant at the .01 level (2-tailed).

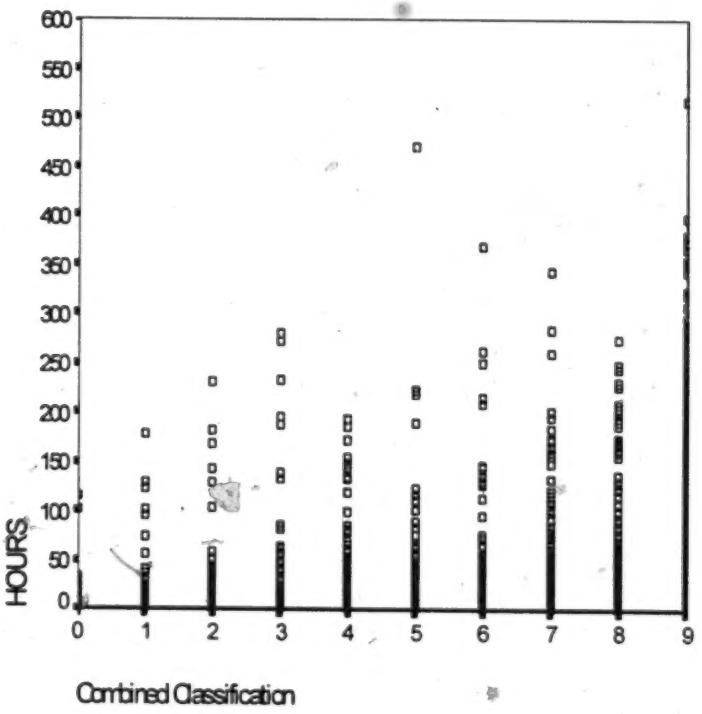
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	86	7.1076	5.7865	.6240	5.8669	8.3482	.25	32.25
		1	140	8.4500	13.0238	1.1007	6.2737	10.6263	.25	133.75
		2	119	8.4265	11.4402	1.0487	6.3497	10.5032	.50	109.75
		3	227	10.7048	17.5882	1.1674	8.4045	13.0052	.25	236.75
		4	150	13.8400	28.4778	2.3252	9.2454	18.4346	.25	300.00
		5	142	13.7007	20.0470	1.6823	10.3749	17.0265	.25	164.00
		6	84	14.7202	21.1539	2.3081	10.1296	19.3109	.25	179.00
		7	135	23.0963	37.3192	3.2119	16.7437	29.4489	.25	202.75
		8	118	31.5042	52.3066	4.8152	21.9680	41.0405	.25	229.25
		9	262	83.0859	106.6064	6.5862	70.1171	96.0547	.25	661.75
		Total	1463	26.7184	57.7460	1.5097	23.7569	29.6799	.25	661.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	1075783	9	119531	45.712	.000
	Within Groups	3799403	1453	2614.868		
	Total	4875186	1462			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.302	3019	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.383**
		HOURS	.383**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	3019	3019
		HOURS	3019	3019

**. Correlation is significant at the .01 level (2-tailed).

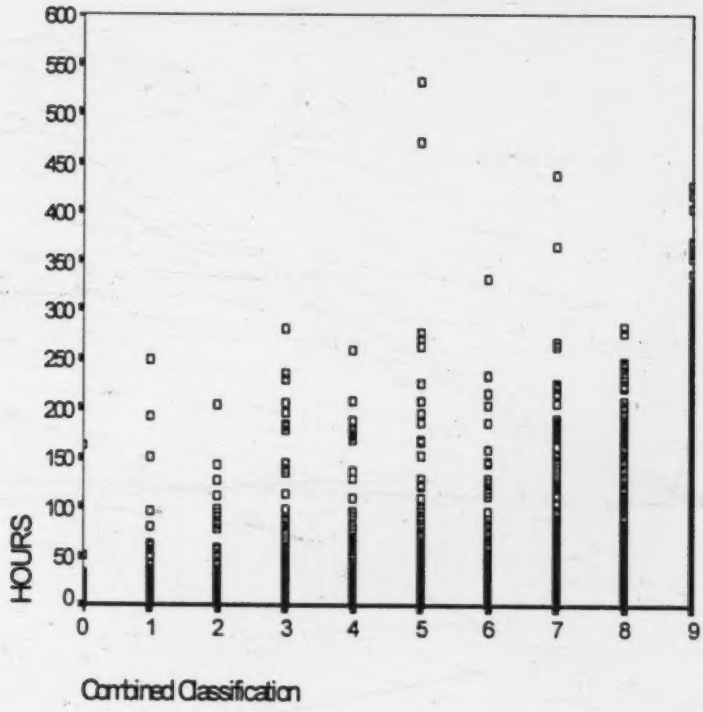
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	139	8.4964	13.9471	1.1830	6.1573	10.8355	.25	117.00
		1	292	9.0334	17.7008	1.0359	6.9947	11.0721	.25	179.25
		2	255	12.7314	25.7494	1.6125	9.5558	15.9069	.25	231.75
		3	398	14.3191	29.5494	1.4812	11.4072	17.2310	.25	280.50
		4	343	15.1778	27.5008	1.4849	12.2572	18.0985	.25	194.50
		5	298	18.3834	38.3305	2.2204	14.0136	22.7531	.25	471.00
		6	174	28.2500	52.6505	3.9914	20.3718	36.1282	.25	370.50
		7	299	29.4766	47.5686	2.7510	24.0628	34.8904	.25	343.50
		8	286	43.5009	60.3480	3.5684	36.4770	50.5247	.25	276.00
		9	535	91.5477	93.0280	4.0220	83.6469	99.4484	.25	518.50
		Total	3019	32.6587	59.4914	1.0827	30.5358	34.7817	.25	518.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	2540159	9	282240	104.316	.000
	Within Groups	8141243	3009	2705.631		
	Total	1.1E+07	3018			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.288	4046	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.401**
		HOURS	.401**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	4046	4046
		HOURS	4046	4046

**. Correlation is significant at the .01 level (2-tailed).

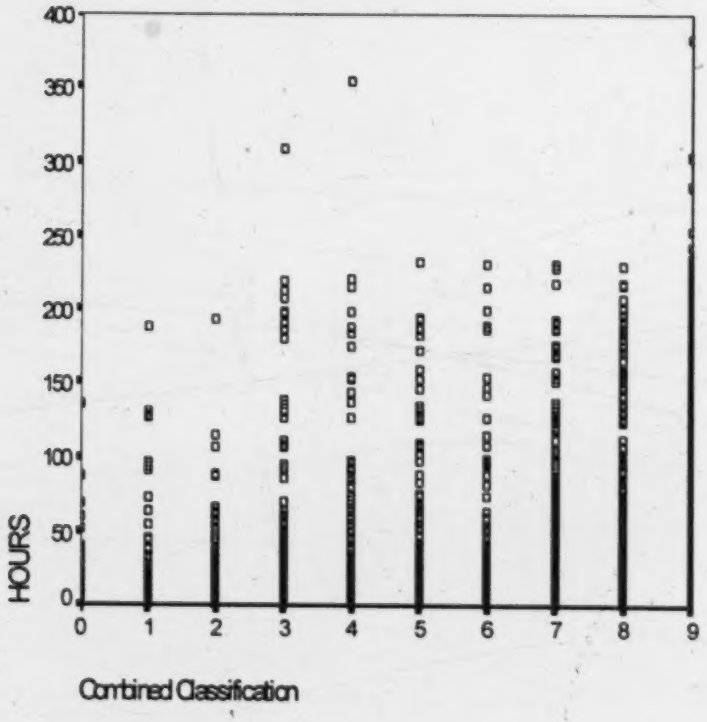
Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	155	7.6468	14.5254	1.1667	5.3420	9.9516	.25	163.50
		1	363	10.5950	21.0589	1.1053	8.4214	12.7687	.25	250.50
		2	320	11.7844	20.8227	1.1640	9.4942	14.0745	.25	204.75
		3	566	15.6612	30.2971	1.2735	13.1599	18.1626	.25	280.50
		4	465	15.8699	29.3143	1.3594	13.1985	18.5413	.25	260.75
		5	408	25.1563	52.1710	2.5828	20.0789	30.2336	.25	531.75
		6	233	27.5869	46.7888	3.0652	21.5477	33.6262	.25	332.25
		7	416	37.9688	56.9178	2.7906	32.4832	43.4543	.25	438.75
		8	431	46.1966	59.7047	2.8759	40.5441	51.8492	.25	284.25
		9	689	96.2496	93.4287	3.5593	89.2611	103.2381	.25	427.75
		Total	4046	35.5312	61.5564	.9677	33.6339	37.4285	.25	531.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	3580185	9	397798	136.673	.000
	Within Groups	1.2E+07	4036	2910.582		
	Total	1.5E+07	4045			

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.265	3904	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.426**
		HOURS	.426**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	3904	3904
		HOURS	3904	3904

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	123	10.1687	17.9045	1.6144	6.9728	13.3646	.25	136.75
		1	293	11.1416	21.0011	1.2269	8.7270	13.5563	.25	189.00
		2	293	12.5768	20.5868	1.2027	10.2098	14.9438	.25	194.00
		3	534	16.2542	33.3489	1.4431	13.4193	19.0892	.25	308.75
		4	456	17.6743	35.6382	1.6689	14.3946	20.9541	.25	354.75
		5	389	20.4524	35.5172	1.8008	16.9119	23.9930	.25	233.25
		6	214	26.9252	40.3870	2.7608	21.4833	32.3672	.25	231.75
		7	420	35.5351	46.7755	2.2824	31.0487	40.0215	.25	232.00
		8	449	46.9159	56.7069	2.6762	41.6565	52.1753	.25	231.00
		9	733	88.6896	78.6442	2.9048	82.9869	94.3923	.25	384.00
		Total	3904	35.7728	55.8381	.8937	34.0207	37.5249	.25	384.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	2985223	9	331691	140.638	.000
	Within Groups	9183908	3894	2358.477		
	Total	1.2E+07	3903			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	86	139	155	123	503
		Expected Count	59.2	122.1	163.7	158.0	503.0
		% of Month	5.9%	4.6%	3.8%	3.2%	4.0%
	1	Count	140	292	363	293	1088
		Expected Count	128.0	264.2	354.1	341.7	1088.0
		% of Month	9.6%	9.7%	9.0%	7.5%	8.8%
	2	Count	119	255	320	293	987
		Expected Count	116.2	239.7	321.2	309.9	987.0
		% of Month	8.1%	8.4%	7.9%	7.5%	7.9%
	3	Count	227	398	566	534	1725
		Expected Count	203.0	418.9	561.4	541.7	1725.0
		% of Month	15.5%	13.2%	14.0%	13.7%	13.9%
	4	Count	150	343	465	456	1414
		Expected Count	166.4	343.4	460.2	444.0	1414.0
		% of Month	10.3%	11.4%	11.5%	11.7%	11.4%
	5	Count	142	298	408	389	1237
		Expected Count	145.6	300.4	402.6	388.5	1237.0
		% of Month	9.7%	9.9%	10.1%	10.0%	10.0%
	6	Count	84	174	233	214	705
		Expected Count	83.0	171.2	229.4	221.4	705.0
		% of Month	5.7%	5.8%	5.8%	5.5%	5.7%
	7	Count	135	299	416	420	1270
		Expected Count	149.5	308.4	413.3	398.8	1270.0
		% of Month	9.2%	9.9%	10.3%	10.8%	10.2%
	8	Count	118	286	431	449	1284
		Expected Count	151.1	311.8	417.9	403.2	1284.0
		% of Month	8.1%	9.5%	10.7%	11.5%	10.3%
	9	Count	262	535	689	733	2219
		Expected Count	261.1	538.9	722.2	696.8	2219.0
		% of Month	17.9%	17.7%	17.0%	18.8%	17.8%
Total		Count	1463	3019	4046	3904	12432
		Expected Count	1463.0	3019.0	4046.0	3904.0	12432.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

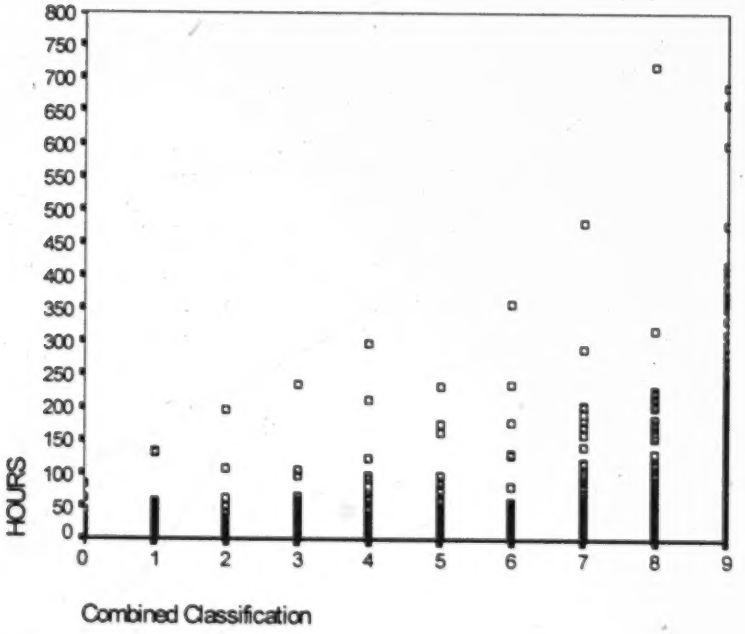
	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	63.655[a]	27	.000
Likelihood Ratio	63.380	27	.000
Linear-by-Linear Association	20.433	1	.000
N of Valid Cases	12432		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 59.19.

Appendix G: PROV

PROV June 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.338	7787	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.325**
		HOURS	.325**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	7787	7787
		HOURS	7787	7787

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

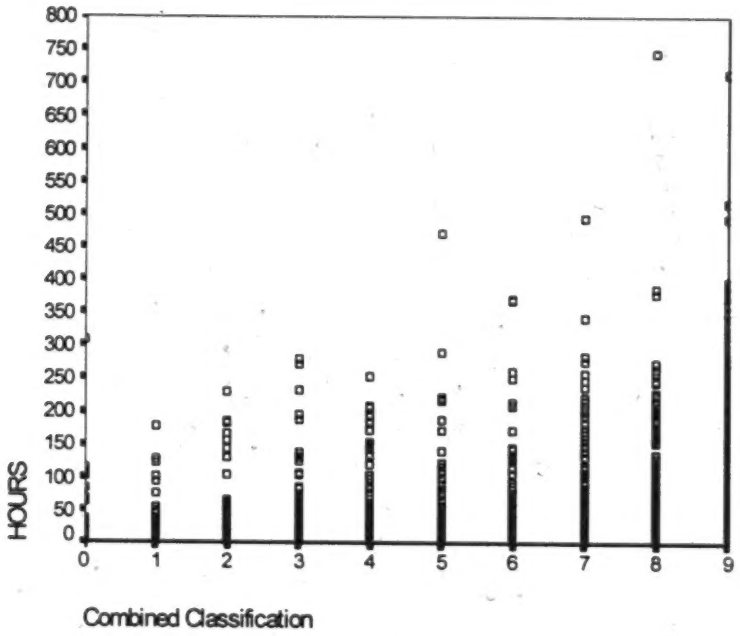
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	955	5.6702	6.1015	.1974	5.2827	6.0576	-.25	85.00
		1	952	6.9081	8.9854	.2912	6.3366	7.4796	.25	133.75
		2	736	8.0034	10.8789	.4010	7.2162	8.7906	.25	197.75
		3	1008	8.9670	11.7302	.3695	8.2420	9.6920	.25	236.75
		4	797	10.6412	17.1158	.6063	9.4511	11.8312	.25	300.00
		5	638	11.9130	18.0217	.7135	10.5119	13.3141	.25	233.50
		6	392	13.6805	26.2822	1.3275	11.0706	16.2903	.25	360.00
		7	684	16.8988	31.4688	1.2032	14.5363	19.2613	.25	482.75
		8	585	23.4850	47.9853	1.9839	19.5885	27.3816	.25	720.00
		9	1040	52.2106	81.7561	2.5351	47.2360	57.1852	.25	690.00
		Total	7787	16.4327	38.8019	.4397	15.5708	17.2947	-.25	720.00

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	1708699	9	189855	147.447	.000
	Within Groups	1.0E+07	7777	1287.620		
	Total	1.2E+07	7786			

PROV December 1994

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.334	12946	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.358**
		HOURS	.358**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	12946	12946
		HOURS	12946	12946

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

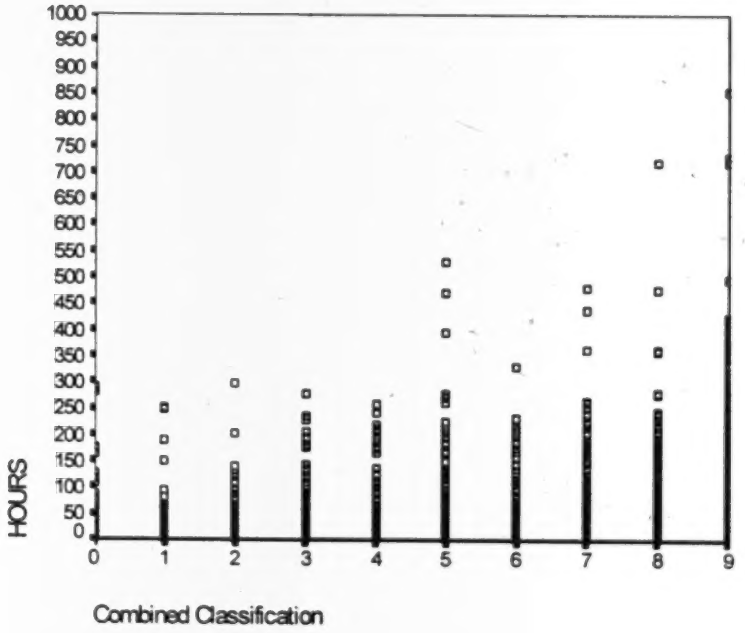
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	1490	5.4359	10.9731	.2843	4.8783	5.9935	.25	310.00
		1	1564	6.6065	9.7434	.2464	6.1232	7.0897	.25	179.25
		2	1294	8.2127	15.0036	.4171	7.3945	9.0310	.25	231.75
		3	1703	9.3840	17.3581	.4206	8.5590	10.2090	.25	280.50
		4	1369	11.0018	20.2077	.5462	9.9304	12.0732	.25	253.75
		5	1099	13.6328	26.6068	.8026	12.0581	15.2076	.25	471.00
		6	668	16.8608	35.2123	1.3624	14.1857	19.5359	.25	372.00
		7	1143	18.6070	36.2899	1.0734	16.5009	20.7130	.25	496.00
		8	1009	27.1715	51.2832	1.6145	24.0034	30.3396	.25	745.50
		9	1607	62.4529	83.2922	2.0778	58.3774	66.5283	.25	713.75
		Total	12946	18.1827	41.8102	.3675	17.4624	18.9029	.25	745.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	4037868	9	448652	312.177	.000
	Within Groups	1.9E+07	12936	1437.170		
	Total	2.3E+07	12945			

PROV June 1995

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.326	15535	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.372**
		HOURS	.372**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	15535	15535
		HOURS	15535	15535

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

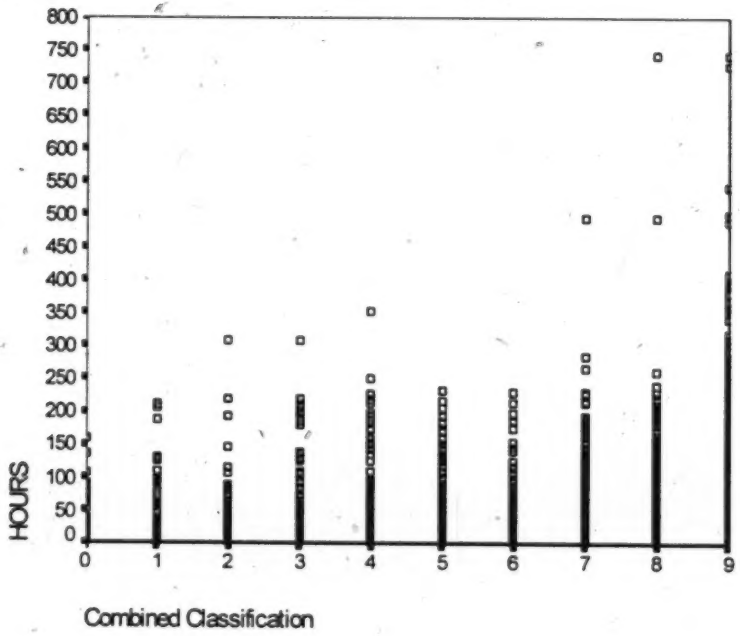
			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	1651	6.2721	14.1794	.3490	5.5876	6.9566	.25	291.50
		1	1723	7.6136	13.4394	.3238	6.9786	8.2486	.25	253.75
		2	1460	8.1125	14.6626	.3837	7.3598	8.8652	.25	300.50
		3	2062	10.5759	18.9223	.4167	9.7587	11.3931	.25	280.50
		4	1669	12.1114	21.2984	.5213	11.0889	13.1340	.25	260.75
		5	1365	16.2251	34.7890	.9416	14.3779	18.0723	.25	531.75
		6	838	17.0274	30.1913	1.0429	14.9804	19.0745	.25	332.25
		7	1416	21.6640	39.1968	1.0416	19.6207	23.7073	.25	481.00
		8	1306	30.3599	51.6789	1.4300	27.5545	33.1653	.25	720.00
		9	2045	67.2672	87.2781	1.9300	63.4823	71.0522	.25	855.50
		Total	15535	20.7044	45.3127	.3636	19.9918	21.4170	.25	855.50

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	5800957	9	644551	383.483	.000
	Within Groups	2.6E+07	15525	1680.782		
	Total	3.2E+07	15534			

PROV December 1995

Scatterplot



Test of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
HOURS	.322	15109	.000

a. Lilliefors Significance Correction

Nonparametric Correlation

			Combined Classification	HOURS
Spearman's rho	Correlation Coefficient	Combined Classification	1.000	.414**
		HOURS	.414**	1.000
	Sig. (2-tailed)	Combined Classification	.	.000
		HOURS	.000	.
	N	Combined Classification	15109	15109
		HOURS	15109	15109

**. Correlation is significant at the .01 level (2-tailed).

Descriptives

			N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
							Lower Bound	Upper Bound		
HOURS	Combined Classification	0	1372	5.1436	10.1415	.2738	4.6065	5.6807	.25	161.75
		1	1579	6.6951	13.8875	.3495	6.0095	7.3806	.25	212.25
		2	1402	8.2209	16.4253	.4387	7.3604	9.0815	.25	310.00
		3	2031	10.0533	19.9795	.4433	9.1839	10.9227	.25	308.75
		4	1722	11.6066	23.5679	.5679	10.4926	12.7205	.25	354.75
		5	1385	13.6572	24.6873	.6634	12.3559	14.9585	.25	233.25
		6	821	15.9339	26.8629	.9375	14.0937	17.7741	.25	231.75
		7	1375	21.2649	36.5439	.9855	19.3316	23.1982	.25	496.00
		8	1318	32.0097	51.6584	1.4229	29.2182	34.8011	.25	744.00
		9	2104	67.6608	83.6831	1.8244	64.0830	71.2385	.25	744.75
		Total	15109	20.8712	44.7316	.3639	20.1578	21.5845	.25	744.75

Oneway Analysis of Variance (ANOVA)

		Sum of Squares	df	Mean Square	F	Sig.
HOURS	Between Groups	6128576	9	680953	426.604	.000
	Within Groups	2.4E+07	15099	1596.217		
	Total	3.0E+07	15108			

Crosstab

Combined Classification * Month Crosstabulation

			Month				
			1994.06	1994.12	1995.06	1995.12	Total
Combined Classification	0	Count	955	1490	1651	1372	5468
		Expected Count	828.8	1377.8	1653.4	1608.0	5468.0
		% of Month	12.3%	11.5%	10.6%	9.1%	10.6%
	1	Count	952	1564	1723	1579	5818
		Expected Count	881.8	1466.0	1759.2	1711.0	5818.0
		% of Month	12.2%	12.1%	11.1%	10.5%	11.3%
	2	Count	736	1294	1460	1402	4892
		Expected Count	741.5	1232.7	1479.2	1438.6	4892.0
		% of Month	9.5%	10.0%	9.4%	9.3%	9.5%
	3	Count	1008	1703	2062	2031	6804
		Expected Count	1031.3	1714.5	2057.3	2000.9	6804.0
		% of Month	12.9%	13.2%	13.3%	13.4%	13.2%
	4	Count	797	1369	1669	1722	5557
		Expected Count	842.3	1400.3	1680.3	1634.2	5557.0
		% of Month	10.2%	10.6%	10.7%	11.4%	10.8%
	5	Count	638	1099	1365	1385	4487
		Expected Count	680.1	1130.6	1356.7	1319.5	4487.0
		% of Month	8.2%	8.5%	8.8%	9.2%	8.7%
	6	Count	392	668	838	821	2719
		Expected Count	412.1	685.1	822.2	799.6	2719.0
		% of Month	5.0%	5.2%	5.4%	5.4%	5.3%
	7	Count	684	1143	1416	1375	4618
		Expected Count	699.9	1163.6	1396.4	1358.1	4618.0
		% of Month	8.8%	8.8%	9.1%	9.1%	9.0%
	8	Count	585	1009	1306	1318	4218
		Expected Count	639.3	1062.9	1275.4	1240.4	4218.0
		% of Month	7.5%	7.8%	8.4%	8.7%	8.2%
	9	Count	1040	1607	2045	2104	6796
		Expected Count	1030.0	1712.5	2054.9	1998.6	6796.0
		% of Month	13.4%	12.4%	13.2%	13.9%	13.2%
Total		Count	7787	12946	15535	15109	51377
		Expected Count	7787.0	12946.0	15535.0	15109.0	51377.0
		% of Month	100.0%	100.0%	100.0%	100.0%	100.0%

Chi-Square Test

	Value	df	Asymp. Sig. (2-tailed)
Pearson Chi-Square	134.741[a]	27	.000
Likelihood Ratio	135.499	27	.000
Linear-by-Linear Association	69.710	1	.000
N of Valid Cases	51377		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 412.11.